# The Chemical Age

**A Weekly Journal Devoted to Industrial and Engineering Chemistry**

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*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

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## A Great Chemist

THE death of Sir Edward Thorpe, which occurred on Monday at the age of 79, removes one more of the great personalities of British chemistry. His life was not only long in years, but full of fruitful activities. Born in Manchester he went to the old Owens College and studied later at Heidelberg, under Bunsen, and at Bonn. On his return to Manchester he served for a time as demonstrator in chemistry under Sir Henry Roscoe. In 1870 he became Professor of Chemistry at the Andersonian Institution, Glasgow, and four years later, on the establishment of the Yorkshire College at Leeds, accepted a similar post there. His first post in London was the Professorship of Chemistry in the Royal College of Science, South Kensington, which he held for nearly ten years; then followed a period of 16 years as Principal of the Government Laboratories. Afterwards he returned to South Kensington as Professor of General Chemistry and Director of the Chemical Laboratories of the Imperial College of Science.

Sir Edward Thorpe, outside professional appointments, held many posts of distinction. He served as President of the Society of Chemical Industry in 1895, as President of the Chemical Society in 1899-1901, and as President of the British Association at Edinburgh in 1921, after having, over thirty years before, been President of the Chemical Section. His address at Edinburgh was mainly concerned with the constitution of the atom, but incidentally he turned aside to denounce the use of toxic gases in war as a degradation of science. Apart from his original investigations of chemical problems, and the considerable part he took in magnetic surveys and solar eclipse expeditions, he was an attractive lecturer and a sound and industrious writer. Perhaps, indeed, his best memorial is to be found in his published works, the greatest of which, of course, is his *Dictionary of Applied Chemistry*, a new edition of which is at present going through the press. This will long remain as a witness to his scholarship, industry, and range of intellectual interests, and be remembered as the work which provided occupation for his active mind up to the end.

## Oil and Colour Chemistry

NOT only was this year's annual dinner of the Oil and Colour Chemists Association an unusually pleasant social gathering, but the speaking was both entertaining and very much to the point. Both Mr. Woolcock, the President of the Society of Chemical Industry, and Dr. Houlston Morgan, the President of the Association, showed that even after-dinner speaking can be made to serve quite a useful and serious purpose without necessarily boring the hearers; in fact, it seemed to us that it was the more serious aspects of their speeches which commanded the closest and most interested attention. Apart from Mr. Woolcock's plea—introduced with the usual delicate touches—for a closer linking-up of chemical organisations, the points most insisted on were the necessity of keeping research at the highest possible level, and the part which associations may play in educating both scientists and industrialists. There is nothing fantastic or alarmist in Dr. Morgan's warning that neglect of it may result in branches of the industry being superseded by newer products discovered by rival researchers; it is what has happened before and must happen again whenever an industry or a firm becomes content with what it has already accomplished and ceases to explore new ground. The only guarantee of safety is continual effort after new knowledge on the part of the chemist, and constant readiness to apply that knowledge on the part of commercial interests. The occasion was well utilised in pressing this point home.

Incidentally it must have been pleasant for Professor G. T. Morgan, who was one of the guests, to hear so many good wishes for the success of the national chemical laboratory at Teddington, of which he will be the superintendent. Although one often hears distrust expressed towards the idea of State-directed research, the only alternative—that the State should do nothing—is even worse. The objection really applies not so much to State research as to a State monopoly of research—which would, indeed, be disastrous. There is no idea here of monopolising research or of forcing it into departmental channels or of stifling it

with regulations; the purpose is rather to stimulate and helpfully direct it. The new chemical research laboratory at Teddington will be an experiment, a beginning. Dr. Morgan fortunately starts free from the restraint of established customs and conventions, and the freer he remains the better for the experiment. His selection for the post is universally approved, and it must be an encouragement to have the sympathy and the good will of the profession in laying foundations for what we believe must in time become a vital part of the national research service.

## A Good Borax Year

THE shareholders and directors of Borax Consolidated, Ltd., have every reason to feel satisfied with the position of affairs and the future business prospects revealed in the Chairman's review of the past year. The final dividend declared makes 12½ per cent. for the year; the net profits are £426,192; the resources of ore are described as practically unlimited in quantity and favourably situated geographically; and the plant and processes, as one might expect, are maintained at the most modern level of efficiency. The Chairman recognised that if the suggested prohibition of the use of boric acid as a food preservative is put in force the volume of the company's business must necessarily be affected, but at the worst the effect is not likely to be severe. It is, however, not at all certain that a total prohibition of preservatives will come into operation, for this attitude has latterly been challenged by influential authorities. The Earl of Chichester, in his speech from the chair, put the case for a moderate use of boric acid as a preservative in fair and reasonable terms, and he is sure to have at least some supporters in his conclusion "that a careful and impartial investigation will establish that on balance the advantages derived from the reasonable use of boric acid as a food preservative far outweigh any theoretical disadvantages that can be advanced as an argument against it."

## Congratulations

ON Sunday, March 1, Mr. Richard B. Pilcher will complete thirty years as Secretary of the Institute of Chemistry, and twenty-five years as Registrar and Secretary. The congratulations he will no doubt receive from many quarters will be numerous and sincere, for he has played a great part in organising chemistry on a professional basis, and has always been ready, through the Institute which he has served with equal enthusiasm and wisdom and through his more personal activities, to work for the good of the profession and the welfare of its members. So notable an anniversary could not, of course, be allowed to pass unobserved, and it is not surprising to hear that the Council of the Institute has invited the Fellows and Associates to join in presenting a suitable memento to the Registrar. The presentation, which will include a roll of the subscribers, will be made at the annual general meeting on Monday, at the conclusion of which the Council, with other well-wishers, will entertain Mr. and Mrs. Pilcher and their family to dinner at the Hotel Russell, where, later in the evening, they will hold a reception.

## Points from Our News Pages

A letter is published on "New Developments in Anthraquinone Dyestuffs (Durand and Huguenin, S.A.) (p. 195).

The third of Mr. G. Holmes's lectures on Chemistry in Relation to Agriculture is reported (p. 195).

An interesting article on "The Production of Shale Oil by the N–T–U Process," by Mr. G. W. Wallace appears on p. 196.

The annual dinner of the Oil and Colour Chemists' Association is reported (p. 200).

A highly satisfactory result for the year was recorded at the annual general meeting of Borax Consolidated, Ltd. (p. 203).

The death is announced of Professor Hildebrand, Professor Walther Dieckmann, Messrs. M. F. Milne, F. D. Gibbons, W. Aird, and Sir Thomas C. Allbutt (pp. 204–5).

Our London and Scottish market reports reveal only moderate, steady business this week (pp. 211 and 214).

## The Calendar

| | | |
|---|---|---|
| 1925 Mar. 2 | Society of Chemical Industry (London Section). Joint meeting with the Institute of Chemistry (London Section). | Burlington House, Piccadilly, London. |
| 2 | Institute of Chemistry (Manchester Section): "Chemical Poisoning Occurring Amongst Industrial Workers." Dr. Arnold Renshaw. 7 p.m. | Lecture Room of ManchesterLiterary and Philosophical Society |
| 2 | Institution of the Rubber Industry (London Section): "Standardised Rubberware." Fordyce Jones. | Engineers' Club, Coventry Street, London. |
| 2 | Royal Society of Arts. Cantor Lecture (III): "The Inner Structure of Alloys." Dr. Walter Rosenhain. 8 p.m. | John Street, Adelphi, London. |
| 2 | University of Birmingham Chemical Society: "Cellulose and its Products." A. D. Sheasby. 5.30 p.m. | Chemical Lecture Theatre, Edgbaston. |
| 3 | Institute of Metals (Birmingham Section): "Slags and Fluxes; their Composition and Uses." J. H. Russell. 7 p.m. | Chamber of Commerce, New Street, Birmingham. |
| 3 | Hull Chemical and Engineering Society. Joint meeting with the Chemical Engineering Group of the Society of Chemical Industry: "Pneumatic Transport of Materials." Dr. W. M. Cramp. 7.45 p.m. | Grey Street, Park Street, Hull. |
| 3 | West Yorkshire Metallurgical Society: "The connection between the Microstructure and the Mechanical Properties of Metals and Alloys. 7.30 p.m. | George Hotel, Huddersfield. |
| 3 | Institute of Metals (N. E. Coast Section): "Electric Furnaces." A Glynne Lobley. 7.30 p.m. | Electrical Engineering Lecture Theatre, Armstrong College, Newcastle-on-Tyne. |
| 3, 4, 10 & 11 | University of London: Four Lectures on "Chemical Combination in Metallic Alloys and its Nature." Professor C. A. Edwards. 5.30 p.m. | Imperial College, Royal School of Mines, South Kensington. |
| 4 | Society of Public Analysts: Ordinary Meeting. 8 p.m. | Burlington House, Piccadilly, London. |
| 5 | Chemical Society: Papers by I. C. Faulkner, T. M. Lowry and E. M. Richards | Burlington House, Piccadilly, London. |
| 6 | Society of Chemical Industry (Manchester Section). Joint meeting with the Liverpool Section. "Chemical Constitution and Properties of Azo Dyestuffs." Dr. A. Schedler. | Textile Institute, 16, St. Mary's Parsonage, Manchester. |
| 6 | Institute of Metals (Sheffield Section): "The Evolution of the Furnace." J. A. Lee. 7.30 p.m. | The University, Sheffield. |
| 7, 14 & 21 | Royal Institution: Three Lectures. "The Counting of the Atoms." Sir Ernest Rutherford. 3 p.m. | 21, Albemarle Street, London. |

# "Developments in Anthraquinone Vat Dyestuffs"

*To the Editor of* THE CHEMICAL AGE

SIR,—In reference to the article which has appeared under the above heading in Volume XII, No. 290, of your journal dated January 3 last, we wish to point out that according to our Letters Patent No. 186,057 we have protected already in the year 1921 a process for converting into soluble products the Leuco derivatives of vat dyestuffs generally. We had to start with one product, and we chose Indigo on account of its greater importance, but we could just as well have started with the Anthraquinones. If another party have chosen the latter, it does not follow that they have discovered something new. The fact is that a range of Leuco derivatives of other vat colours including Anthraquinone derivatives have been converted by us into soluble dyestuffs according to our patented process.

This fact can be seen from the article which appeared in No. 10 of *Melliand's Textilberichte* of October, 1924, in reference to the address made by one of our directors at the 9th Congress of Chemists and Colourists which was held in Vienna from May 25 to May 29, 1924, when, as stated in the above mentioned journal, it was pointed out that the following initials had been chosen :

O for the derivatives of Indigo,
A ,, ,, ,, the Algole vat colours,
H ,, ,, ,, the Helindone vat colours,
I ,, ,, ,, the Indanthrene vat colours,
T ,, ,, ,, the Thioindigos.

Besides, samples of the water soluble enolic ethereal salts of Leuco Indanthrene Blue RS and Algole Red B have been submitted on request to the Japanese Patent Office, as far back as November 22, 1923, and December 15, 1924, respectively. Samples of the water soluble enolic ethereal salts of Leuco Indanthrene Blue RS, Leuco Flavanthrene, and Leuco Indanthrene Blue CGD have been submitted by us to the Swiss Patent Office already on November 3, 1923, and June 12, 1924, respectively, and samples of quantities manufactured in bulk of the water soluble enolic ethereal salts of Leuco Helindone vat dyestuffs were sent, for instance, to England in December last.

You would oblige by publishing this letter in your journal, mainly so as to rectify the statement in the above-mentioned article whereby we have applied our patent only to Leuco Indigo and its derivatives. We may add that the Leuco compound of the vat dyestuff known commercially as Caledon Jade Green can be converted according to our patented process into a water soluble enolic ethereal salt just as well as the Leuco compounds of many other vat dyes, of which latter those considered most valuable to the textile industry will be brought out successively by us.—Yours, etc.

DURAND AND HUGUENIN S.A.

Bâle, February 23.

## Norway's Chemical Progress

MR. GABRIEL CONRADI, Norwegian Consul-General, speaking in London on Commercial Developments in Norway, said that the chemical, electro-chemical and electro-metallurgical industry was the most recent departure in Norwegian industry. It had developed with an exceptional rapidity, and would, no doubt, in future become the most important industry. Its development had been rendered possible by the great waterfalls, and it utilised nearly half of the water-power which was harnessed to-day. The most important of the industries in this connection was the manufacture of nitrates carried on by the Norsk Hydro-Elektriesk Kwelstopaktieselskap, at Notodden, and Bjukan in the Talemark, in Eastern Norway. This company was the first to produce on an industrial scale nitrates from atmospheric nitrogen. Nitrate of lime, or Norway saltpetre, of which 200,000 tons could be produced annually, was the chief product. Several nitrogen compounds were in demand, these including nitrate of soda used in the dye industry, and pure nitrate of soda used in various industries instead of purified Chilean nitrate, and also to a certain extent as a fertiliser.

# Chemistry's Relation to Agriculture

## Mr. Holmes's Birmingham Lectures

IN the third of the series of public lectures on "Chemistry in its Relation to Agriculture," by Mr. E. Holmes, given in the Chemistry Department of the University of Birmingham on February 18, the lecturer outlined the experiments which led to the recognition of the existence of an extensive soil population. He considered the chemical effects of these multitudinous organisms in so far as they affected the complicated processes denoted by the terms carbon cycle, nitrogen cycle, and sulphur cycle, in nature.

The soil flora and fauna was composed of algæ, fungi, bacteria, protozoa, and the larger invertebrates, including worms and the larvæ of many insects. The numbers of each of these were continually fluctuating, but to give some idea of the complexity of the soil population it was stated that an average soil contained, of bacteria alone, something like twenty million per gram (9,000,000,000 per pound !). Russell and Hutchinson, at Rothamsted, had found that the numbers of bacteria and protozoa were always inversely related, since protozoa feed on bacteria and so tend to keep down their number. Further, they had found that, although complete sterilisation of a soil stopped all organic oxidations and so on, yet partial sterilisation was followed by an increase in the amounts of these beneficial reactions. This had been explained by supposing the protozoa to be more susceptible to extreme soil conditions, and thus killed off more quickly than the bacteria, which survived the partial sterilisation and, in the absence of protozoa, developed rapidly.

The preliminary work of decomposing the plant residues added to a soil was largely effected by worms, which destroy cellular structure and excrete the organic matter in a form readily attacked by the micro-organisms. Many bacteria had the property of obtaining their energy by the oxidation of carbohydrates such as sugars and starches, and non-nitrogenous organic matter in general, but the specific property of decomposing cellulose was possessed by only a few. Of these *spirochaeta cytophaga* was probably the most interesting. It was first systematically studied and isolated in this country, and its controlled action was now being used in the production of "synthetic farmyard manure."

In the acquirement of energy from nitrogenous organic matter by many organisms ammonia was set free as a by-product, i.e., the evolution of ammonia was only incidental to the process. This was followed by the more specialised reactions producing nitrites and nitrates respectively. The first reaction was shown to be brought about by two genera, the first, *nitrosomonas*, a rod-like bacterium, and the *nitrosococcus*, a non-mobile form found in South America. The oxidation of the nitrites to nitrates was effected by the *nitrobacter*, an organism consisting of minute tapering rods.

### Nitrogen Fixing Organisms

The problem of the fixation of atmospheric nitrogen by root nodule and other bacteria was solved by Hellriegel and Wilfarth, and this was now a well recognised process. Two types of nitrogen fixing organism had been distinguished, the *azotobacter*, isolated by Beijerinck, which was associated with the root nodules of legumes, and the *clostridium*, isolated by Winogradsky, which lived free and independently in the soil. *Azobacter* was aerobic and *clostridium* was anaerobic. These organisms converted atmospheric nitrogen to protein which subsequently nitrified to give nitrate available for the plant.

The lecturer then referred to the sulphur organisms which could derive their energy from purely inorganic sources. They oxidised elemental sulphur, sulphides, sulphites and thiosulphates to sulphuric acid, which went immediately to sulphates in the soil. More astonishing bacteria were the organisms, isolated from South African soils, which converted arsenites to arsenates, and still others which oxidised zinc blende to the sulphate.

Sulphur, it was indicated, was now being added to potato soils to raise their acidity, by the action of *thiobacillus thiooxidans*, and so inhibit the growth of the potato scab organism. Further, the same treatment might be the means of converting the harmful sodium carbonate of alkali soils to less toxic compounds, and so bringing such soils into cultivation.

# Production of Shale Oil by the N-T-U Process

## By G. W. Wallace

*Some time ago we published an account of the N-T-U Company's process for the treatment of shale for oil extraction and of the immense deposits held by the company in California and elsewhere in the United States. Since then the tests have been carried to a much farther point and the results are now described by Mr. G. W. Wallace, a well-known consulting engineer and specialist in shale oil problems.*

With the ever increasing utility and demand for petroleum and its products and in view of the many predictions which have been made regarding the supply of petroleum, it would seem very important that the industrial interests should know of the definite progress which has been made in the production of petroleum oil from shale and the immediate possibility of increasing this production to the extent where

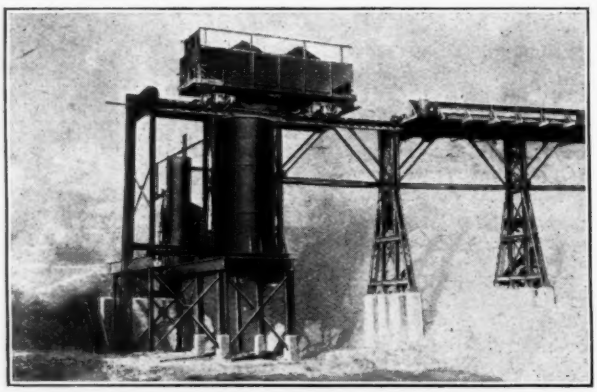


Fig. 1.—General view of Commercial Unit showing 40-ton Steel Charging Truck on Broad Gauge Track from Quarry.

it will (1) become a source of crude oil sufficient in quantity to replace the depletion and augment the supply of the ground oil; and (2) stabilise the selling price of petroleum, thereby insuring a constant growth of the industries dependent upon the same.

To those unacquainted with the present oil shale situation it should be said that for many years shale has been distilled in Scotland, and the oil produced refined into the various products now produced from petroleum which are in every-day use. This statement raises the question as to why, if they have been able successfully to operate a shale oil industry in Scotland, the same methods cannot be used in the United States and other countries.

Briefly, the Scotch process utilises an externally heated vertical retort which tapers from the top to the bottom, the lower two-thirds being of brickwork and the upper one-third of cast iron. The retort is heated to a higher temperature at the bottom than at the top. The crushed shale is fed through the retort continuously from the top to the bottom and in its passage becomes sufficiently heated to produce and distil the oils from the shale, the major portion of the oil being produced in the upper cast iron section, the utility of the lower section being to elevate the temperature of the spent shale to that required for the formation of volatile ammonium products. The heat is applied by burning gases in flues surrounding the retort, and while the gases produced during the distillation of the shale are used for this purpose it has been found necessary to augment the same with gases produced from coal in a producer gas plant. The Scotch retorts are approximately thirty inches in diameter at the bottom and thirty feet high, and are capable of retorting in the neighbourhood of four tons of shale in twenty-four hours. The cost of installation and operation of Scotch retorts is high.

The majority of other proposed processes utilise similar principles, that is, they consist of retorts externally heated, within which the shale is distilled, and are built usually of brickwork, in some cases iron has been used. Many modifications have been suggested, but to date the Scottish process is the only process utilising externally heated retorts that has succeeded in continually operating and producing shale oil over a period of years. Unsuccessful attempts have been made to adapt the Scotch process to the American shales.

In the spring of 1922 the N-T-U Company built an experimental plant in Santa Barbara County, California, to develop and perfect a process utilising internal combustion for the distillation of shale. It was thought that many of the costly features connected with externally heated retorts could and would be eliminated if and when proper control was secured in the application of direct internal combustion to a body of shale to bring about the production and distillation of the shale oil.

Figure 4 is a view of this experimental plant. It consists of a steel shell eight feet in diameter and twenty-four feet high, lined with brick and is called a generator in contra-distinction to externally heated retorts. This chamber, or generator, holds a charge of twenty tons of shale. The outlet for the oils and gases is located at the bottom of the generator and connects with a fan type gas exhauster on the suction side.

The generator is charged with shale and ignited at the top. By a down draft through the column of shale a zone of combustion is set up at the top of the column of shale. The products of combustion in travelling down through the shale maintain a zone of distillation which travels progressively downward from the top to the bottom of the chamber below the fire.

The oil as it is produced from the shale either condenses in the cool shale underlying the zone of distillation or is carried by the gases to the usual standard condensing and scrubbing apparatus where it is recovered, and added to the oil condensed in the generator and pipe lines.

The air used to maintain combustion is modified by returning some of the gaseous products of combustion from the outlet of the last scrubber, thus reducing the oxygen content of the medium of combustion, thereby lowering the temperature of the zone of combustion, or in other words, the fire, and increasing the distance between the zone of combustion and the zone of distillation.

Briefly, the effect of modifying the oxygen content of air used to maintain combustion is explained as follows: When using air without modification the temperature of the zone of combustion, or fire, is directly proportional to the velocity of the air passing through the fire, and similarly the temperature of the gaseous medium of distillation is proportional to both

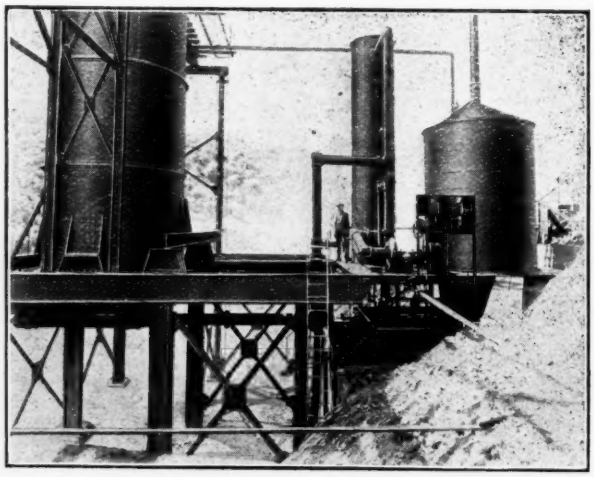


Fig. 2.—40-ton Capacity Commerical Unit with Condenser and Scrubber.

the temperature of the fire and the velocity of air passing through the same.

When the air is modified by returning products of a previous combustion the temperature of the fire is inversely proportional to the amount of modification and the velocity of the modified air gas mixture. Similarly, the temperature of the gases which are the medium of distillation is lower while the quantity of the same is greatly increased. In this manner it

FIG. 3.—N-T-U COMPANY'S RESEARCH LABORATORY.

is possible to increase the transfer of B.T.U.'s from the source of heat, or fire, to the zone of distillation and at the same time maintain a lower working temperature which can be adjusted to meet the requirements of any type of shale by regulating the amount of returned gases.

By modifying the air used for combustion in the manner outlined above complete control of the apparatus is secured, and it is found that a zone of distillation can be maintained and caused to travel progressively downward through the shale at a considerable distance below the fire. The time required to complete the distillation is approximately eighteen hours.

It is virtually impossible to subject the oil to a temperature higher than that of its formation, which is approximately between seven and eight hundred degrees Fahrenheit, as the oil produced is immediately brought in contact with the cool shale underlying the zone of distillation. The extent of this protecting action can be better understood from the following temperature record :—

| Duration of hours. | Temp. below grade. |
|---|---|
| 2 | 148° F. |
| 4 | 152° F. |
| 6 | 154° F. |
| 8 | 160° F. |
| 10 | 160° F. |
| 12 | 160° F. |
| 14 | 166° F. |
| 16 | 220° F. |
| 18 | 400° F. |
| 20 | 897° F. |
| 21 | 1191° F. |

This experimental generator was operated over a period of twelve months, during which time the process was subjected to a thorough study.

The following cost summary is an average of thirty days operation of the experimental generator and should be compared with the costs secured operating the commercial unit :—

N-T-U COMPANY—MONTHLY STATEMENT.

LABOUR COSTS 20-TON EXPERIMENTAL SHALE PLANT.

| Item. | Cost. | Cost/Ton | Cost Gal. Oil. |
|---|---|---|---|
| Mining Shale | 160·92 | ·438 | ·0153 |
| Transporting shale | 116·61 | ·317 | ·0110 |
| Crushing | 211·68 | ·576 | ·0201 |
| Operating | 248·74 | ·677 | ·0236 |
| Discharging | 440·84 | 1·200 | ·0419 |
| Oil Storage | 21·60 | ·058 | ·0020 |
| Water supply | 28·30 | ·077 | ·0026 |
| Repairs | 40·44 | ·110 | ·0038 |
| Fuel | 25·15 | ·068 | ·0023 |
| Miscellaneous | 17·00 | ·046 | ·0016 |
| Total | $1,311·28 | 3·567 | ·1242 |

SUMMARY.

| | |
|---|---|
| Shale charged | 367·1 tons |
| Oil produced | 10,506 gallons |
| Cost per ton | $3·57 |
| Cost per gallon | ·124 |

This summary shows that virtually all of the excessive labour and expense in operating this experimental generator was incurred in the transportation and crushing costs and in the cost of discharging the apparatus.

As a result of the above experimental operation, a commercial unit was designed and built. This unit was so arranged and equipped as to minimize the items of cost which were found to be excessive in operating the experimental plant.

This forty-ton unit has been in operation for one year, has never failed to perform and has not developed any defects which retard its operation. Following is a cost summary giving the results actually secured operating this forty-ton unit. These results have been checked and verified by Smith, Emery and Company, consulting engineers, of San Francisco, and by engineers employed by substantial financial interests in New York to report on the process.

LABOUR COSTS DIRECTLY CHARGEABLE TO OPERATION OF FORTY-TON GENERATOR.

OBTAINED BY SMITH, EMERY AND COMPANY.

AVERAGE CHARGE 38·5 TONS.

| | No. Men. | Time. | Man Hrs. | Rate. $ | Total. $ |
|---|---|---|---|---|---|
| Mining and crushing | 5 | 4·5 hrs. | 22·5 | ·55 | 12 375 |
| Transportation | 6 | 6 min. | 0·6 | ·55 | 0·330 |
| Charging | 3 | 33 min. | 1·65 | ·55 | 0.908 |
| Generator operation | 3 | 8 hrs. | 24·0 | 5·00 da | 15.000 |
| Discharging | 1 | 40 min. | ⅔ | ·55 | 0·366 |
| Spent shale disposal | 2 | 6½ hrs. | 12⅔ | ·55 | 6.966 |
| Total labour charge | | | | | $35.945 |
| Power (light, pump, blower, crusher, winch) 295·6 k.w.h. @ 2c. | | | | | 5,912 |
| | | | | | $41.857 |

| | Cost/Ton. $ |
|---|---|
| Mining and crushing | ·3214 |
| Transportation | ·0085 |
| Charging | ·0236 |
| Generator operation | ·3896 |
| Discharging | ·0095 |
| Spent shale disposal | ·1809 |
| | $0·335 |
| Power (light, pump, blower, crusher, winch) 295·6 k.w.h. @ 2c. | ·1536 |
| | $1·0971 |
| Yield of oil—gals. per ton | 38.89 |
| Cost per gallon | ·028 |
| Cost per barrel | 1.176 |

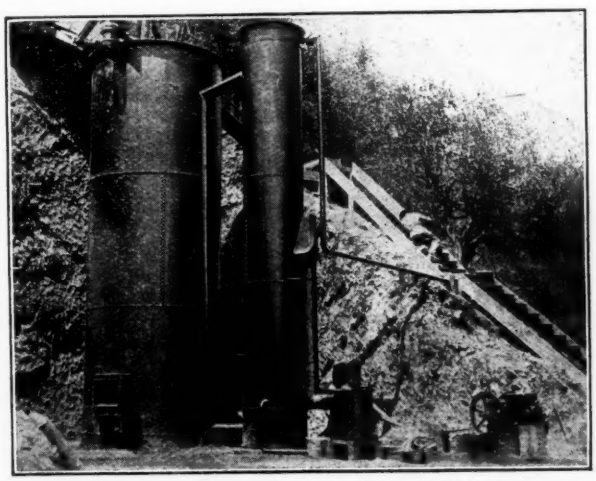


FIG. 4.—20-TON EXPERIMENTAL UNIT. N-T-U PROCESS.

By actual test, five men mined forty-tons by hand in three hours—equivalent to fifteen man hours, or ·375 man hours per ton, which is a rate of ·1875 for hand mining operation.

Continued operation of the forty ton plant shows that the charge for electric power given above is high as the total cost over months of operation covering lights, pump, crusher, car, etc., amounts to exactly two cents per ton of shale carbonized.

Comparing the above costs with the costs secured during the operation of the twenty-ton experimental unit is an excellent illustration of how economies may be and were obtained through handling materials in large quantities, and it is needless to say that these results were very gratifying.

Following is a summary of costs prepared by W. S. Burd, General Superintendent of the Newport Chemical Company, who reported on the operation of this plant:—

It is probable that this cost may be reduced somewhat by doing all charging and discharging within a period of sixteen hours.

Mining cost will vary with the character of mining operations necessary. At the plant of the N-T-U Company at Santa Maria, the mining cost is estimated as follows:

| Mining Expense: Labour— | | $ | $ Per Ton. | |
|---|---|---|---|---|
| Shovel operators | 3 @ | 6.00 | 18.00 | |
| Crusher men | 3 ,, | 5.00 | 15.00 | |
| Labourers | 6 ,, | 4.00 | 24.00 | |
| Total labour | | | $57.00 | ·057 |
| Powder, dynamite and fuses | | | | ·050 |
| Powder, 45 kw @ ·02 | | | | ·009 |
| Maintenance of shovel | | | 9.00 | ·009 |
| Maintenance of other equipment | | | 12.00 | ·012 |
| Total cost of mining | | | | ·137 |

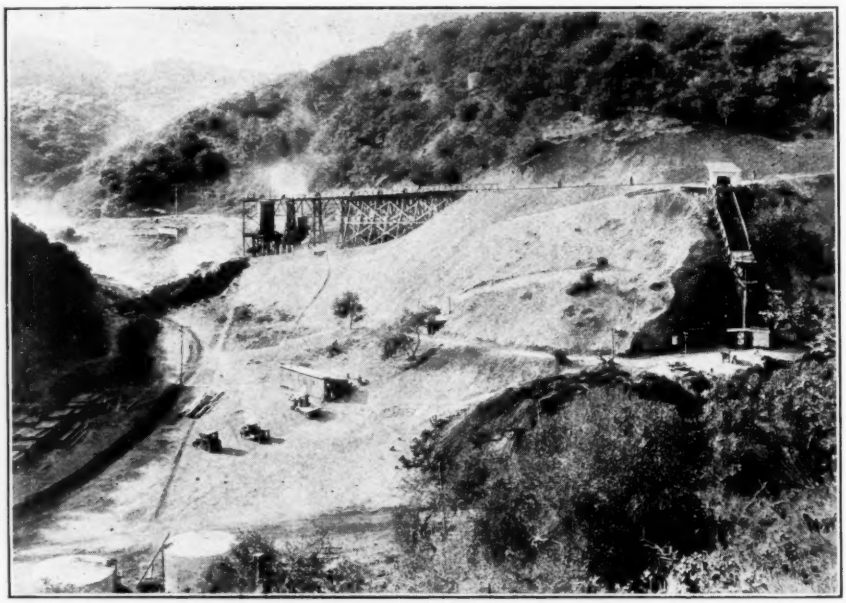


FIG. 5.—LAYOUT OF N-T-U COMPANY'S SHALE OIL PLANT UNDER CONSTRUCTION AT SANTA MARIA, CALIFORNIA, U.S.A.

ESTIMATED COST OF OPERATION.
1,000-ton per Day Plant.

| | | $ | Per Ton. $ | |
|---|---|---|---|---|
| Direct Labour— | | | | |
| Charging | 3 men per shift @ 4.25 avg. | | 38.25 | |
| Operating | 2 ,, ,, ,, @ 4.40 ,, | | 26.40 | |
| Spent shale disposal | 5 ,, ,, ,, @ 4.15 ,, | | 62.25 | |
| Pump man | 1 man on days @ 4.40 ,, | | 4.40 | |
| Total direct labour | | | $131.30 | ·131 |
| Maintenance— | | | | |
| Master mechanic | 1 @ | 6.65 | 6.65 | |
| Electricians | 2 ,, | 6.00 | 12.00 | |
| Mechanics | 4 ,, | 6.00 | 24.00 | |
| Handy men | 3 ,, | 5.00 | 15.00 | |
| Oiler | 1 ,, | 4.50 | 4.50 | |
| Yardman | 3 ,, | 4.50 | 13.50 | |
| Total maintenance labour | | | 75.65 | ·076 |
| Supervision and Overhead— | | | | |
| Superintendent | 1 @ | 10.00 | 10.00 | |
| Foreman | 3 ,, | 7.00 | 21.00 | |
| Chemist | 1 ,, | 6.00 | 6.00 | |
| Clerk | 2 ,, | 4.50 | 9.00 | |
| Storekeeper | 1 ,, | 5.00 | 5.00 | |
| Watchman | 3 ,, | 3.00 | 9.00 | |
| Total supervision and overhead | | | 60.00 | ·060 |
| Dehydrating | | | | ·020 |
| Supplies, per day | | | 30.00 | ·030 |
| Power approx. 5 kw per ton @ ·02 per kw | | | | ·100 |
| Taxes and insurance @ 3%–$30·00 per day | | | | ·030 |
| General office and shipping @ 25% | | | | ·112 |
| Total cost—exclusive of mining, interest and depreciation | | | | ·559 |

SUMMARY.

| | |
|---|---|
| Total operating cost | ·559 |
| Mining cost | ·137 |
| Total | $0.696 |

In California the yield of oil per ton of shale ranges from thirty-two to forty-eight gallons. In Utah the yield ranges up to fifty-six gallons per ton of shale, and it may safely be assumed that workable shale from both of these deposits will yield approximately one barrel per ton.

Following is a summary obtained as a result of careful examination of Utah shale oil:—

Product per 100 Gallons of Crude Oil.

| Product. | Gallons refined. | Specific gravity. | Colour. |
|---|---|---|---|
| Gasoline | 6·68 | ·760 | Water white |
| Heavy Naphtha | 6·70 | ·780 | Water white |
| Intermediate Burning Oil | 5·74 | ·804 | Water white |
| Heavy Burning Oil | 1·80 | ·822 | Water white with yellow tinge. |
| Gas Oil | 6·57 | ·857 | Amber T.L., blue R.L. |
| Paraffin and Lubricating stock to be pressed and separated by distilling into lubricating oils | 40·35 | | Yellow T.L., green R.L. |
| Total refined products | 67·84 | | |
| Petroleum Coke per 100 gals. of Crude Oil | | | 63 lbs. |
| Distillation Loss including Coke and Gases | | | 10·06 per cent. |
| Coke can be sold and gas burned. | | | |
| Sulphuric Acid used per 100 gals. of crude | | | 3·028 gals. |
| Acid Treating Loss | | | 22·10 per cent. |

DISTILLATION TEST OF OIL RECOVERED.
Ten per cent. Fractions.

| Fraction | Temp. | Sp. Gr. | Flash P. | Burn. | Sp. Gr. Cold. |
|---|---|---|---|---|---|
| Initial B.P. | | | | | |
| 10 per cent. | 388 | 782 | — | — | — |
| 20 ,, | 459 | 829 | 99 | 120 | — |
| 30 ,, | 523 | 864 | 159 | 170 | — |
| 40 ,, | 590 | 892 | 208 | 237 | — |
| 50 ,, | 629 | 906 | 232 | 264 | 44 |
| 60 ,, | 640 | 911 | 96 | 212 | 53 |
| 70 ,, | 590 | 875 | 58 | 98 | 52 |
| 80 ,, | 617 | 886 | 64 | 80 | 53 |
| 90 ,, | 685 | 903 | 63 | 86 | 55 |
| 92·2 ,, | — | 950 | 52 | 64 | 87 |

End Point 716
Residue Coke
Unsaturated Hydrocarbons, 48·0 per cent.; Nitrogenous Tars, 1·9 per cent.; Sulphur, ·48 per cent.; Ammonium Sulphate, per ton, 19·8 lbs.

It is believed that the quantity of marketable products will be increased above the results submitted herein when the oil is refined commercially. However, these results indicate the character of the oil.

It should be noted that due to inadequate condensing equipment some of the lighter hydrocarbons were lost. Tests of the gases indicated approximately three gallons of gasoline per ton of shale, or approximately six gallons per hundred gallons of oil, therefore, the expected gasoline yield from one hundred gallons of crude Utah shale oil will be approximately twelve per cent. of the crude oil instead of 6·68 per cent. as shown in the above summary.

The California oil is of different nature than the Utah shale oil. Following is a summary resulting from the examinationa of the California shale oil :—

| | |
|---|---|
| Gravity | 11·7 |
| Flash (Cleve. Op. Cup) | 235 |
| Burn (Cleve. Op. Cup) | 285 |
| Chill | Sluggish at 0° F. |
| Moisture | Trace |
| Per cent. Sulphur | 5·70 |
| Per cent. Sed. and Hoist.—A | ·2 |
| Unsaturated Hydrocarbons | 90 per cent. |
| Furol Vis. at 77° F. | 49 |
| Per cent. off at 500° F. | 4·5 |

DISTILLATION TEST.

| I.B.P. 457° F. Fraction. | Temp. °F. | Stream Gravity. |
|---|---|---|
| Start. | 270 | — |
| 10 per cent. | 532 | 24·7 |
| 20 per cent. | 579 | 21·1 |
| 30 per cent. | 612 | 19·6 |
| 40 per cent. | 640 | 18·4 |
| 50 per cent. | 651 | 18·4 |
| 60 per cent. | 662 | 18·1 |
| 70 per cent. | 698 | 16·8 |
| 80 per cent. | 741 | 12·8 |
| 90 per cent. | 662 | 10·7 |

| | |
|---|---|
| Overhead | 91·25 |
| Coke | 7·59 |
| Loss | 1·16 |

While it is a fact that all shale oils are refinable, it should be stated that some shale oils can be refined to greater advantage than others; for instance, the Utah and Colorado shale oils are similar to Scotch shale oil. They may be considered more or less paraffin base oils. On the other hand, California shale oil is an asphalt base, contains a very high percentage of sulphur, and it is not amenable to refining processes to the same degree as the Utah shale oil.

Scotch shale oil is comparable to the shale oils from Utah, New Brunswick and France, which all refine out approximately seventy per cent. total marketable products such as gasoline, kerosene, fuel oil, lubricating oils and wax.

Regarding the oil produced by this process from Utah shale a quantity of Utah shale was retorted in an externally heated retort and the oil subjected to complete refining. The results secured differed very little from the results secured from the same shale when distilled by the internal combustion process. If anything, the oil produced by the latter process was slightly superior.

Following is a rough estimate showing approximate value of the refined products from one hundred gallons of Utah shale oils, including light oils from scrubbers :—

| | |
|---|---|
| Gasoline—10 gallons at 15*c.* | $1.50 |
| Naphtha—8 gallons at 10*c.* | .80 |
| Burning Oils—6 gallons at 6*c.* | .36 |
| Gas Oil—8 gallons at 3*c.* | .24 |
| Lubricating Oils—30 gallons at 15*c.* | 4.50 |
| Paraffin Wax—50 to 60 lbs. at 5*c.* | 2.50 |
| Gross total | $9.90 |

The following rough estimate showing the approximate value of refined products from 100 gallons of California shale oil :—

| | |
|---|---|
| Gasoline (N.N.)—35 gals. at 15*c.* per gal. | $5.25 |
| Lubricating oil—17 gals. at 15*c.* per gal. | 2.55 |
| Fuel oil—35 gals. at 2*c.* per gal. | .70 |
| Total | $8.50 |

The cost of refining and selling California shale oil should approximate that of ground oil.

As this article is based on actual operation of the N-T-U Company's plant over a period of two years it is thought that the information furnished justifies the belief that the time has arrived for the commencement of the shale oil industry in a substantial commercial manner both in the United States and many foreign countries.

It is pointed out that among the ever increasing demands for petroleum and its products there are certain uses which require stabilisation of its selling price. Not long ago due to fluctuations in the cost of gas oil many gas companies turned from the manufacture of carburetted water gas to coal gas.

When a sufficient quantity of shale oil is produced to stabilise the selling price of petroleum and its products many additional industries will find its use convenient and profitable.

With the shale oil industry established on a commercial basis the production of oil for industrial uses will become a manufacturing project and much of the speculative features encountered in the present production of ground oil will be eliminated.

## The Waterproof Garment Industry

A MEETING of the Manchester Section of the Institution of the Rubber Industry was held on Thursday, February 19, when Mr. J. Haworth, secretary of the India Rubber Manufacturers' Association, read a paper on "The Waterproof Garment Industry in Manchester."

In the course of the paper, Mr. HAWORTH urged that the best method to adopt for the improvement of manufacturing conditions was to make communal arrangements so that all concerned could collectively endeavour to stop the present mad price competition in regard to what were admittedly low price productions, and substitute therefor a competition in quality. The first step to take would be a working arrangement between the proofers and garment makers, which would provide, *inter alia :*

(1) That no further "non-guaranteed" proofing orders should be executed;

(2) That indiscriminate and unrestricted supplies of proofed cloth should be discontinued, and that all sections of the trade should combine to limit to a minimum the issue of proofed cloth to firms or individuals not regularly engaged in the waterproof garment industry;

(3) That steps should be taken generally to discourage the production of cheap machine-made garments which are, at the moment, prostituting the industry to the detriment of employers and workpeople in all sections of the trade; and, conversely,

(4) To encourage the production of "quality" goods by some expedient which would enable the buying public clearly to discriminate between a sound article and an inferior and unserviceable production. If the waterproof garment makers in the Manchester district would refuse to proof with any proofer who supplied "non-guaranteed" proofing, or supplied proofed cloth contrary to regulations which might be devised, or who undertook proofing orders for anyone outside the ranks of *bona fide* garment manufacturers except on conditions, then an inestimable boon would be conferred upon the trade.

# Oil and Colour Chemists

## Views on Association Policy at the Annual Dinner

THE annual dinner of the Oil and Colour Chemists Association was held at the Holborn Restaurant, London, on Friday, February 20. Dr. H. Houlston Morgan (president) was in the chair, and there were present about 100 members and guests, including Mr. W. J. U. Woolcock (President of the Society of Chemical Industry), Dr. J. C. Philip (Chemical Society), Mr. R. B. Pilcher (Institute of Chemistry), Dr. G. T. Morgan (Superintendent of the new Government Chemical Laboratory, Teddington), Dr. R. S. Morrell, Dr. Stephen Miall, Mr. A. G. Cryer (President of the National Federation of Paint, Colour and Varnish Manufacturers), and Mr. J. E. Butterworth (President of the National Federation of Master Painters and Decorators).

### Industrialists' Attitude to Science

Mr. W. J. U. WOOLCOCK (President of the Society of Chemical Industry), proposing the "Oil and Colour Chemists Association" and coupling with it the name of the President (Dr. H. Houlston Morgan), said he had been trying to find out a little about the association and as far as his researches went he had discovered nothing but what gave him the greatest possible pleasure. The association, from the technical and scientific side, had accomplished what was not always possible for a body of scientific men to accomplish. Scientists who were brought into touch with industrialists occasionally found that the latter were not as receptive of scientific enthusiasm as they might be, but as far as the oil and colour industry and the science attached to the industry were concerned the association seemed to have done remarkably well. It was not easy to get manufacturers to recognise that there was some considerable value to be got out of organised research, but that was one of the things the association had accomplished, because he had discovered a very cordial co-operation between the industrial and the technical side of their branch of the industry.

In the particular branch of chemical industry with which they were concerned, namely, paint, varnish, linoleum, printing ink and so on, there was probably greater scope for organised research than in any other branch of chemical industry. He had that day travelled to London with one of those distinguished gentlemen who held chairs at universities and who was about to place his services at the disposal of the Government in an attempt, which it was hoped would be successful, to introduce a little more science into the Government. He had asked him whether he could say why linseed oil dried. (Laughter.) It seemed an obviously simple question, but he realised, as the answer was being given to him, that he was really being told nothing at all. (Laughter.) Even now he did not know why linseed oil dried, or why the driers put into linseed oil made it dry. There were a number of problems of that kind upon which a great deal of research could yet be done.

### Problems Awaiting Attention

There were a number of problems to which the oil and colour industry must give its attention, and it was to the Oil and Colour Chemists Association they had to look. A striking instance of the value of the work done in the industry was in connection with printing ink and colours in relation to posters. He occasionally saw some of the beginnings of these posters in the particular dyestuffs which were used in making the printing ink and which were ultimately going to result in the very beautiful things that they now saw in the form of posters. Two things struck one at once in this connection—first, the extraordinary beauty of some posters, and, secondly, the fact that the cost of their production, which must be very great, could only be recouped by the permanence of the work. Some years ago it was thought satisfactory if a poster could withstand the inclemency of the weather for perhaps a fortnight, and whoever put a poster up was probably satisfied with that, but now some of the posters remained permanent for perhaps six months and even more. In that direction extraordinary strides had been made, and he hoped that in the future the development of British dyes would be such that they would be used to an even greater extent than 80 per cent.

Although he had expressed satisfaction with the work of the industry and the association, he would like to take them a little further because he was not quite sure whether in the amount of work they had done they had quite realised that there was, in the kindred associations, a link with the big industries with which the oil and colour industry had something in common, and he was not perfectly certain that every step had been taken to see that they were pulling their weight in the boat or in the team, as well as pulling their weight in the branch of the industry to which they specially belonged. He was, therefore, hoping that the association would give a little thought to the movement for co-operation which found expression—as the presence of Professor Philip reminded him—in the Bureau of Abstracts, and in half a dozen other ways in the linking up which was taking place between the Chemical Society, the Society of Chemical Industry and the Institute of Chemistry. What part was the Oil and Colour Chemists Association going to play in that? Were they going to paddle their own canoe and were they perfectly satisfied so far as their own branch of the industry went? He thought not. It was quite impossible for any industry or association to get the best out of its members unless it took some interest outside its own association, and he therefore suggested that it would be a splendid thing if they could, with the assistance of their Council, find some means to develop in this direction.

### Results Achieved by the Association

THE PRESIDENT, replying to the toast, said it would be seven years in April since half a dozen people met together and attempted the formation of yet another association in the realm of applied science, an association of specialists or as some people said, experts. The term "expert" was very glibly used nowadays and had a very elastic meaning; frequently an expert was merely just an ordinary man away from home. (Laughter.) During the formation and development of the Oil and Colour Chemists Association there were many difficulties to contend with and many prejudices and even oppostion to overcome, yet he ventured to think that the mere presence that evening of such a distinguished gathering was an indication that the efforts of the founders of the association had not been in vain. The generous manner in which the toast had been received was assuredly proof that the association had not only filled a void, but that it had a definite part to play in the development of the oil and colour industry and in the progress of applied science. The records of the association showed that it had done a certain amount of useful work of a concrete nature, such as holding meetings for the reading and discussion of papers, the publication of a modest journal and the rendering of assistance and advice to such bodies as the National Federation of Paint, Colour and Varnish Manufacturers, the Federation of British Industries, the Air Ministry, the War Office, the British Engineering Standards Association, etc.

There had, however, been a considerable amount done of a less concrete nature more important than all that. He referred to the more or less sub-conscious effects of association upon each individual member, the stimulation of thought which was vastly more important than the mere presentation of papers. Few of them who had found their way into the industrial field had the spirit of the old time philosopher who gave the world his best when he was working in seclusion and without holding converse with his fellow-men, and the vast majority now needed the stimulus of healthy rivalry in order to give them the necessary breadth of vision which could never be obtained by mere reading or by ploughing a lonely furrow in the laboratory. Fraternisation and social intercourse between men who had to contend with similar difficulties in life and had similar problems to solve was in itself a tonic to the average industrial chemist, dejected perhaps because some particular problem was proving refractory. A fellow-feeling made one not only wondrous kind, but it very often cleared the mental vision by producing fresh points of view and suggesting new methods of attack.

### Future Problems for the Industry

These were some of the unseen, unrealised and often unsuspected benefits an association such as theirs conferred on the individual, and the point which the individual members of the industry must consider was whether they were going to be left behind in the march of progress or were going by collective effort to reach that goal which had already been reached by many other industries in Great Britain and

even by the oil and colour industry in the United States, a goal reached by co-operation, mutual understanding, joint discussion, organised research, the pooling of information and the dissemination of knowledge? It was only by these means that the association could progress. There was no doubt that we are living in an era when knowledge was being very rapidly gained. We knew a good deal more to-day about materials and the forces of nature than did our ancestors, and if the members of the association do not learn more about their own particular industry and the best methods to be employed they must not forget that others were certainly learning more about their own particular industries, and there was the danger that they would find, ere long, that either protective coatings of paints and varnishes would no longer be required or that some type of coating other than that of the linseed oil or drying oil type presented distinct advantages over those which were being made to-day. Protective coatings of the drying oil type would need to be considerably improved during the next 100 years or so, or there would be very little demand for them.

However, he would close on a more hopeful note borne of the optimism and enthusiasm of Mr. Woolcock and of the gratitude which he himself felt for the very generous reception the toast had received. As Mr. Woolcock had said, the association had made progress. During the past 12 months it had worked in closer co-operation with the National Federation of Paint and Varnish Manufacturers than ever before, and he had great pleasure in welcoming to the dinner the President of that body, Mr. A. G. Cryer, together with Mrs. Cryer. He would like to add a word about Mr. Woolcock, the President of the Society of Chemical Industry, and Professor Morgan, the director of research of the new National Chemistry Laboratory. They had made a forced march from Manchester in order to be present at the dinner, and they were grateful to them as well as to the many other distinguished guests, men eminent in industry and commerce as well as in pure and applied science. He took their presence to be a happy augury for the future, not only of the association, but of the paint and varnish industry as a whole.

Mr. NOEL HEATON proposed "Our Guests," and coupled with it the names of Mr. A. G. Cryer (President of the National Federation of Paint, Colour and Varnish Manufacturers) and Mr. J. E. Butterworth (President of the National Federation of Master Painters and Decorators).

Mr. A. G. CRYER said the degree of co-operation in various directions which existed during the war indicated the necessity for the manufacturing and trading sections to place greater reliance on the advice of chemists, because the country could not afford to continue to work on the rule of thumb methods which had held sway far too long in England. The position generally was being considerably improved by the work of such associations as the Oil and Colour Chemists Association, which was making known the real importance of the work of the chemist both in research and in manufacturing operations.

Mr. J. E. BUTTERWORTH also responded.

### India's Chemical Requirements

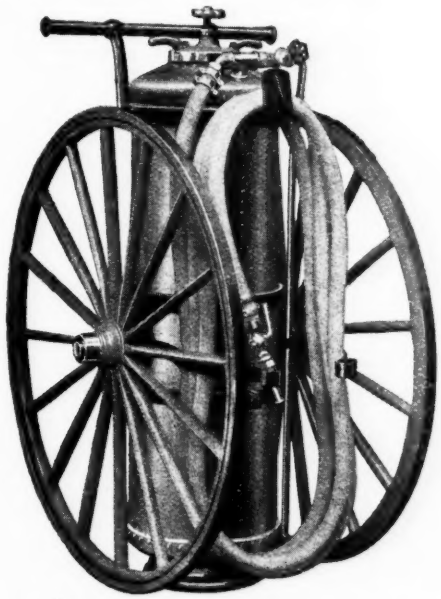
THE demand for foreign chemicals in India has increased steadily during the past two years. The principal chemicals consumed are those required in the bleaching, dyeing, and finishing of textiles. A smaller demand exists for chemicals used in the manufacture of soap, paint, and glass, the tanning and curing of hides, and in the metallurgical industries. Sulphuric, hydrochloric and nitric acids; alum; ferrous sulphate; and certain ammonia, barium, iron, lead, magnesium, potassium and sodium compounds are manufactured. The annual production of sulphuric acid is estimated at 20,000 tons. The known sulphur deposits in India are not capable of being worked profitably, due to location, and attempts made in Burma to produce sulphuric acid from zinc concentrates had to be abandoned. A potential source for sulphuric acid exists in the rich deposits of sodium sulphate, but the present methods of handling the crude material are inadequate. The elimination of the duty in 1924 should result in increased imports of sulphur and give an impetus to the manufacture of superphosphates, ammonium sulphate, and, to a lesser extent, nitric, and hydrochloric acids, magnesium and aluminium sulphate.

## Fighting Oil Fires

### Essential Qualities of an Efficient Extinguisher

THE rapid increase in the use of oil fuels has brought into still greater prominence the necessity for an efficient extinguisher. Expert research has resulted in the production of an efficient foam named "Phomene" by the Pyrene Co., Ltd., of 9, Grosvenor Gardens, London, S.W.1. When applied to the surface of the blazing oil it quickly spreads, forming a blanket of foam, which effectively cuts off the supply of oxygen and extinguishes the flames.

But there are more points to consider than the simple covering of the flame by foam in the first instance. It is possible that the intense heat might have the effect of depleting



"PHOMENE" FOAM TYPE FIRE ENGINE, FOR INDOOR USE, 34 GALLONS CAPACITY.

the efficiency of the foam and resulting in re-ignition. There is the question also of whether the solution gives the maximum effective expansion and remains tough and complete. Two other important points are the rapidity of expansion when the foam is applied and the suitability of the substance for storage in hot climates.

"Phomene" has been proved by searching tests to comply with all these conditions, and the method of extinguishing oil fires by means of foam is fully approved by the Board of Trade and the Fire Offices Committee, which body represents the interests of the leading insurance companies in the British Isles.

As the demand for such an efficient fire protection warrants, "Phomene" appliances are numerous and varied. They range from a specially designed scheme for the protection of oil storage tanks, with special precautions to prevent explosions rendering the installation useless, to small wall cylinders of handy size. Wheel fire engines are made in indoor and outdoor types and are arranged so that they can be easily and expeditiously worked by one man. Of particular interest is the 34 gallon steam operated "Phomene" engine. This is worked on the ejector principle and overcomes dilution difficulties usually due to steam condensation. Other designs are manufactured for marine fire risks, and the whole question of oil fire extinguishing has been so carefully covered by the manufacturers of "Phomene" that every type of user is specially catered for and every contingency guarded against.

An interesting and practical book on "How to Fight Oil Fires," just published by the Pyrene Co., Ltd., can be had on application to the company's engineering department, at 9, Grosvenor Gardens, London, S.W.1.

## The British Association of Chemists

### Scheme of National Propaganda

ALTHOUGH the membership of the Association continues to increase, the executive realises that if rapid advance is to be made, a large increase in membership is necessary. Each section is undertaking its own propaganda so that undue pressure upon the head office may be avoided. Further, it has been found that local effort is productive of better results than any more comprehensive scheme, however well organised, which is directly under the control of headquarters.

The executive desires to appeal to all qualified chemists to support the Association. It becomes increasingly evident that the profession of chemistry requires an organisation similar to that of the British Medical Association; and this crying need the British Association of Chemists is endeavouring to supply. It has already done much to further the interests of the professional chemist, and if the hoped-for increase of 2,000 in its membership is realised—and it must be realised—this year, the time is not far distant when the profession of chemistry will enjoy most of the privileges to which the profession of medicine so justly lays claim.

All chemists holding a degree or diploma in chemistry with requisite experience are eligible for membership. In certain cases also chemists without paper qualifications are admitted; and the applications of such will always receive the careful consideration of the Nominations Committee. This concession, however, is liable at any time to be reconsidered and withdrawn.

There is probably no chemist who does not realise the necessity of making chemistry a "close" profession. In order to accomplish this, many concessions will have to be made to those already in practice. But the longer the delay, the more serious will this problem become; and since the British Association of Chemists appears to be the only body able and willing to deal with this formidable problem, a large increase in its membership is the only means by which this pressing necessity can be realised.

In view of the fact that a propaganda fund is being raised, the executive appeals to all members, and those seeking election, to support the fund with donations. In common with all other societies, the Association is suffering some financial stress, and the nature of its work entails a heavy expenditure which cannot be met but by generous contribution to this fund. The Council desires to thank those members who have so generously responded to the appeal that has been made in the "monthly circular."

Among the advantages of membership may be mentioned the unemployment benefit fund, in virtue of which members who are out of employment obtain substantial relief; the legal aid department, which gives free advice on all legal matters, and the appointments bureau. Members of the Association can also obtain rebate on income tax which in most cases covers the cost of the subscription.

Full particulars can be obtained from the General Secretary, British Association of Chemists, Bedford House, 108, Baker Street, London, W.1.

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### South Africa's Fertiliser Imports Increase

IMPORTS of fertilisers into the Union of South Africa totalled 53,823 tons, valued at £169,881 in 1923, compared with 27,094 tons, worth £98,174, in 1922. Of the 1923 receipts, 23,971 tons, valued at £81,335, consisted of superphosphates—a 58 per cent. increase over 1922. Supplies are now drawn chiefly from the Netherlands, United Kingdom, Belgium, and Germany. The Netherlands has over 60 per cent. of the trade. Other items of importance are basic slag, raw phosphate, potash manures and sulphate of ammonia. Belgium is the chief supplier of basic slag, sending over 80 per cent. of the total requirements, which in 1923 amounted to 8,022 tons. This amount represents a 50 per cent. increase over 1922. The South Sea Islands furnish the bulk of raw phosphate, but small quantities come from the United States and Egypt. The import trade in potash manures is practically monopolised by Germany, which furnishes about 80 per cent. of the total requirements. Sulphate of ammonia is obtained from the United Kingdom, which contributed a value of £3,696 in 1923, compared with a value of £55 in 1922.

## Chemical Work of the Shirley Institute

### Progress of Cotton Research

A MEETING of the Manchester Section of the Society of Dyers and Colourists was held on Friday, February 28, in the lecture room of the Manchester Literary and Philosophical Society, Mr. Julius Heubner presiding. A paper entitled "A Resumé of Work Done in the Chemical Department of the Shirley Institute" was read by Dr. D. A. Clibbens (of the British Cotton Industry Research Association).

Dr. CLIBBENS stated that much of the work of the Chemical Department of the Shirley Institute was intended to form part of a comprehensive analytical investigation of cotton having for its chief objects the determination: (1) Of the nature of the minor constituents of cotton and the extent to which they varied in raw material of different origins; (2) of the extent to which these constituents were altered or removed during the bleaching process; and (3) of the extent to which the cellulose itself was altered by the chemical agents used in bleaching, printing and other technical processes. The paper dealt, in particular, with the progress which had so far been made in the study of the chemical properties of bleached cotton and the way in which these were affected by oxidising agents. It was shown that in a number of oxidised cottons prepared with a variety of different oxidising agents a high copper number was accompanied by a low methylene blue absorption and *vice versa*. This inverse relation suggested a differentiation of oxycelluloses into two types similar to those distinguished by Witz and called by him "oxycellulose properly so-called" and "celluloglucose"; the former was characterised by absence of reducing properties, resistance to alkalis, and strong absorption of basic dyes; the latter by the possession of reducing powers and complete or partial solubility in hot dilute alkalis. The properties of oxycelluloses prepared by means of hypochlorite solutions were very sensitive to small changes of hydrogen ion concentration in the oxidising solution near the neutral point, and a complete change of type occurred on passing from very slightly acid (*pH* 4) to very slightly alkaline (*pH* 10) hypochlorite solutions. This change of properties could be explained by changes of equilibrium in the system,

$$HClO \rightleftarrows H^{+} + ClO^{-}$$

and enabled the approximate value $10^{-8}$ to be deduced for the electrolytic dissociation constant of hypochlorous acid, a value in good agreement with that obtained by independent methods.

The loss of weight of oxycelluloses on boiling with dilute alkali was determined by the copper number alone and not by the methylene blue absorption which remained substantially unaltered by the alkaline treatment. The low viscosity of oxycelluloses in cuprammonium solution was a property of all types of oxidised cellulose, the exact value of the viscosity being determined more by the actual consumption of oxygen than by the chemical properties of the resulting oxycellulose. Like the lowered tensile strength, the diminished viscosity of oxidised cotton persisted through subsequent chemical treatment and the measurement was a most reliable method of determining loss of strength in cotton materials resulting from the action of oxidising agents upon them.

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### German-Russian Dyestuff Agreement

THE COMMERCIAL SECRETARY AT BERLIN reports that the *Berliner Tageblatt* states that under the contract which the German-Russian Trading Company ("Russgertorg") concluded last autumn with the German Aniline Dye Concern providing for the delivery of dyestuffs for the Soviet industry and for the holding of up to 500,000 kg. of goods in the consignment warehouses of the "Russgertorg," 200,000 kg. of dyestuffs for the Russian Textile Syndicate have, so far, been imported. The total quantity of dyestuffs to be imported in the course of one year amounts to about 2,000,000 kg. Eight chemists have been sent by the German chemical works to Russian factories. The German dye concern has granted Russian chemists the right to improve their technical knowledge in German aniline dye factories, and chemists who are working in the Russian textile industry are shortly being sent to Germany for this purpose.

## Annual Meeting of Borax Consolidated

### The Chemical Trade Outlook

THE Earl of Chichester (chairman of Borax Consolidated, Ltd.), in reviewing the affairs of the company at the annual meeting on Tuesday in London, referred to the general outlook of the chemical trade. Dealing with the question of ore reserves, he said that their possible reserves of ore for all practical purposes were unlimited. The problem was not one of the amount of raw material available, but which of the sources of supply could be worked at a profit. They were fortunately in the position of owning the most favourably situated properties for economical production.

### Home and Export Trade

Our trade (the chairman continued) has been fairly steady during the 12 months under review, and, while there has been no marked recovery either for the home or export trade, we hope that more settled political conditions will lead to an expansion of trade by which we should benefit. So far as export business is concerned, the unstable exchange situation compels one to exercise especial caution, as it is very possible to lose in doing business under such conditions. The Manchester Chamber of Commerce, Chemical and Allied Trades Section, report for 1924 succinctly sets out the situation. It states :—" It was generally anticipated that the year 1924 would see a revival in the chemical trade, but unfortunately this has not been realised. Trade during the year has been spasmodic, and the few periods of activity have only been of short duration."

In addition to this generally depressed condition of the chemical trade, we have sustained competition from interests which have not the advantages we possess—viz., the most favourably situated sources of supply of high-grade raw material combined with the most up-to-date plant and processes for the refined products, but which have offered products in competition with us at what we are of opinion are unremunerative prices. A business so large, and so uniformly successful for so many years as ours has been, attracts the attention of those who would like to share in its prosperity. We have experienced similar conditions from time to time during the past 26 years, but, as our records show, without very serious effect upon our business. I will once more repeat that it is a fundamental policy with us to keep the price of our products as low as is compatible with a fair trading profit, and to give our customers the benefit of reduction in cost when we are able to effect this.

### Food Preservatives

You will have seen the agitation concerning the use of boric acid as a food preservative and the consequent proposed legislation, and possibly some among you may ask what the effect of a restricted use of the product for this purpose would have upon our business. We have supplied a specially pure make of boric acid for food-preservative purposes, but the quantity involved is only a small percentage of our total business, and therefore, while there will be some loss of profit if boric acid is entirely prohibited as a food preservative, it will not amount to a serious figure, and the regular increase in the demand for both borax and boric acid for industrial uses which we can reckon upon in normal times should, we have every reason to believe, soon make up the loss should it occur. I may say here that during the very large and extended experience we have had in the production of boric acid and borax in our refineries in various parts of the world we have never known illness to occur which could be attributed to these products in the case of employees working year in and year out in an atmosphere of them, breathing and absorbing them continually, but, on the contrary, our workers are exceptionally free from the troubles which it is claimed in some quarters arise from their use. Our works are open for medical examination as to the correctness of this statement, and we are always ready in every way to assist in an investigation and to arrive at the truth. We have no wish to benefit by the sale of our products for any particular purpose if it can be conclusively shown that in such case they are harmful to the public.

### Advantages of Boric Acid

There is, on the other hand, ample evidence spread over the past 50 years of the beneficial effect of the moderate and reasonable use of boric acid as a food preservative, enabling producers in distant places to ship their products here to arrive in a wholesome state and fit for consumption, and so to cheapen some of the most necessary and perishable food products. We look upon much of the agitation that has occurred as largely factitious, supported by faddists or by well-meaning people, misled by incorrect or insufficient information, investigation, or by unjustifiable inferences, and possibly also supported by trade interests which might hope to obtain an advantage by its prohibition. We have confidence, therefore, that a careful and impartial investigation will establish that on balance the advantages derived from the reasonable use of boric acid as a food preservative far outweigh any theoretical disadvantages that can be advanced as an argument against it.

We have decided to recommend a final dividend of 7½ per cent., making with the interim dividend already paid a total of 12½ per cent. for the year. This will mean that we shall carry forward to next year £165,733 os. 7d., or an increase of £28,652 on the amount brought in.

Colonel J. W. Reid (vice-chairman) seconded the motion for the adoption of the accounts and the declaration of the dividend named, which was carried unanimously.

## Mineral Oils: Present and Future Uses

### Paper by Professor Boswell

THIS was the title of a lantern lecture delivered by Professor P. G. H. Boswell at a joint meeting of the members of the Liverpool Section of the Society of Chemical Industry and of the Liverpool Geological Society, at the Liverpool University, on Wednesday, February 18. Mr. E. Thompson presided over a large attendance.

Professor BOSWELL said the question of the mineral oil resources of the future would cause some trepidation to geologists, because it was extremely dangerous at any time to predict what mineral resources were likely to be forthcoming, and it was still more dangerous in the case of oil. It would be easier to give some idea of the future resources of oil locked up in oil shales rather than free and in liquid form. It was not so much a question of the origin of oil as of the migration of oil and then its storage.

By means of slides the Professor dealt with what he termed the progress of oil from the mushroom growths to the fully equipped stations, and said there was a definite limit to the production of free mineral oil, though he would not go so far as to say that that limit was twenty years. Oil shales could not be worked whilst liquid oil was being produced for fairly economic reasons. There was, he said, little fear of the future oil resources giving out, although the cost of oil might go up, as there were very large resources of oil shales which were practically unexploited. There were in many parts of the world large resources of shale oils, particularly in America, in Montana, Wyoming, and the Eastern States. If a process could be invented for dealing satisfactorily with the sulphur content of oil from oil shales, a process which was economic and stable, oil resources would outlast those of coal. In this connection reference was made to the petroliferous areas in various parts of the world, and the lecturer said there were in those areas supplies available to which they could look for any future extension.

Mr. E. MONTAG, the President of the Liverpool Geological Society, voiced the thanks of his fellow members to Professor Boswell for his very interesting paper. He thought the Professor had put the position very accurately.

In the course of a brief discussion, Dr. ALFRED HOLT said that when one remembered that they had had scares from time to time that oil supplies were giving out, but still had plentiful supplies, they could discount to some extent the fears as to the future.

Mr. E. GABRIEL JONES referred to the mysterious way in which the price of petrol fluctuated, and said he often wondered whether that fluctuation had anything to do with the question of supplies. He supposed it was purely a matter of commerce. The price of petrol was going up at the present time, and had been advancing, with a brief exception, for the last two years, and what would happen when supplies gave out, say in twenty years time as had been mentioned, would be that they would have to resort to alcohol.

Professor Boswell remarked that the fluctuations in the cost of petrol were controlled by the over-production in the United States.

# From Week to Week

MR. COLIN CAMPBELL, D.Sc., at present lecturer, has been appointed senior lecturer in chemistry at Manchester University.

DR. G. C. CLAYTON delivered a lecture on "The Application of Science to Crime" to members of the Mersey Power Recreation Club last week.

THE UNITED STATES coal tar chemical exports showed a 19 per cent. decrease in 1924 over the previous year. Imports, recorded at a value of $20,119,024, showed a 16 per cent. increase.

APPLICATIONS ARE INVITED for the post of lecturer in the Chemistry and Fermentation processes at Manchester College of Technology. Full details may be obtained from the Registrar of the College.

UNEMPLOYMENT in the insured chemical industry during January is recorded at 9,054—7,450 men and 1,604 women. In the manufacture of explosives the returns are 1,455—1,118 men and 337 women. In both industries the figures are much the same as those for the previous month.

AN ANALYSIS OF THE CHARACTER AND WORK of Louis Pasteur, the great French investigator of anti-toxicology, was given by Professor T. M. Lowry, F.R.S., of the Chair of Physical Chemistry, Cambridge, to members of the Newcastle Literary and Philosophical Society on Monday.

THE ANNUAL JOINT CONFERENCE of the local sections of the Institution of Civil Engineers, Mechanical Engineers and Electrical Engineers, took place at Birmingham on Friday, February 20. Dr. S. Z. de Ferranti presided, and a discussion was held on the subject of "The Work of the First World Power Conference."

EXTENSIVE ALTERATIONS AND ADDITIONS are being carried out at the South Yorkshire Chemical Works at Maughan, Greasborough, where 60 new coke ovens are being put down and other important alterations made. About 180 additional men have been engaged on the construction work, and when finished in two years' time work will be permanently found for 70 extra men.

"THE SIZE AND SHAPE OF AN ATOM" was the subject of the lecture delivered on Friday, February 20, by Mr. R. G. Lunnon to the Newcastle Chemical Industry Club. Guesses at the size of the atom, he said, had been made for the last century but only in the last 10 years had accurate estimates been possible. He discussed the sizes of more than 60 of the 88 known elements, and emphasised that the variations were extremely small.

BEFORE MR. JUSTICE FRASER in the King's Bench Division on Wednesday, Isis Chemicals and Dyes, Ltd., of Douglas, Isle of Man, brought an action against the Ophir Syndicate, Ltd., of Devonshire Square, London, and Mr. H. Warner, of Great Winchester Street, London, upon a bill of exchange for £500 dated July, 1923. The Ophir Syndicate, Ltd., did not defend the action. After hearing legal argument his lordship held that the bill was a regular one, and gave judgment against both defendants for £500 and interest, with costs.

AT A MEETING of the Newcastle Section of the Society of Chemical Industry, on Wednesday, February 18, a paper on "A Redetermination of the Atomic Weight of Boron," was read by Professor H. V. A. Briscoe and Mr. P. L. Robinson, professor and lecturer respectively in inorganic chemistry at Armstrong College. Professor W. N. Haworth presided. The paper, which was illustrated by lantern slides, related to a series of investigations made by the authors, from which it appeared that the atomic weight of boron found in different localities might differ to a small extent.

THE PREMIER ELECTRIC WELDING CO., LTD., have decided to discontinue the carrying on of business from their Swansea establishment, but arrangements are being made to extend the company's facilities at their Abbey Wood factory, London, S.E.2, for the manufacture of "Premier" electric arc welding plants and electrodes, in order to meet the rapidly increasing demands for these products. The company's marine and general repair branches in London, Liverpool, Leith, etc., are not affected by the discontinuance of the Swansea branch. The Premier Electric Welding Co., Ltd., is managed and directed solely by Nobel Industries, Ltd., and will be a conspicuous exhibitor at the British Empire Exhibition, 1925.

PROFESSOR W. F. HILDEBRAND, chief chemist of the U.S. Bureau of Standards since 1908, died in a hospital at Washington, on February 7, at the age of 70.

DR. C. H. DESCH has been appointed president of the Chemistry Section of the British Association to be held at Southampton on August 26 to September 2.

THE COUNCIL OF THE CHEMICAL SOCIETY has nominated Dr. A. W. Crossley president, Dr. T. Slater Price secretary, and Professor F. G. Donnan foreign secretary.

DISEASES OF OCCUPATION noted for January include the following figures: lead poisoning, 23; arsenic poisoning, 2; epitheliomatous ulceration, 13; chrome ulceration, 6.

A RESEARCH ASSISTANTSHIP IS OPEN at the Merchant Venturers Technical College, Bristol, to candidates with an honours degree in engineering. Applications should be made to Professor A. Robertson at the College.

DANISH TEXTILE WORKERS AND DYERS declared a strike on Friday, February 20. They demand an increase of 20 per cent. in wages while the employers propose a 10 per cent. reduction. Eleven thousand men are affected.

THE NATIONAL UNION OF SCIENTIFIC WORKERS has been informed by the Treasury that it has been decided, as a result of their representations, to provide in the 1925–26 estimates for an increase in the grant to the Royal Society towards the cost of scientific publications from £1,000 to £2,500.

A DONATION OF £3,000 has recently been received by University College, Leicester, from Stead and Simpson, Ltd., to the fund for the endowment of lectureships in chemistry and physics. The College has also received gifts of £20,000 from the late Mr. H. S. Gee, and £2,000 from Sir Jonathan North.

MEMBERS OF THE NEWCASTLE section of the Society of Chemical Industry paid a visit on Saturday, February 21, to the Stella Gill Coke and By-Product Company's works, Pelton Fell, Durham, by invitation of the directors and Mr. D. S. Murdock, the manager. Mr. H. D. Smith, the secretary, was in charge of the party.

THE SERVICES ARE REQUIRED of a whole-time male assistant in the new chemical laboratory which is being provided for the City Analyst at Leicester. The work will be chiefly connected with the analysis of food and drugs, water and sewage effluents. Applications should be sent to Mr. C. Killick Millard, medical officer of health, by March 5.

ON THE PETITION of A. Oppenheimer and Holt, glass bottle merchants, of 14, Queen Victoria Street, London, E.C., Mr. Justice Romer in the Companies Winding-Up Court on Tuesday made an order for the compulsory liquidation of the Chlorophyl and Chemical Corporation, Ltd. Mr. Israel said that the petitioners were creditors for £130 for goods sold and delivered, and the company was admittedly insolvent.

AN ACID VAT EXPLODED with a loud report at the Mersey chemical works, Bromborough Pool, near Birkenhead, on Tuesday. The lid of the vat, weighing about 7 cwt., was hurled through the roof of a building 45 ft. high. An official had noticed that the vat was reaching an abnormal temperature and ordered the workmen out of the building. Some got away and others threw themselves flat on the floor. Many had lucky escapes and no one was seriously injured. A fire also occurred but was extinguished by the workmen.

DR. WILHELM BORGHERS, Professor of Metallurgy and Electro metallurgy at the Technische Hochschule of Aix-la-Chapelle, whose death is announced, was an authority on the application of electrolytic processes to metallurgical problems, such as the production of metallic calcium, strontium, titanium, cerium, etc., and conducted numerous researches on the preparation and properties of alloys. He was the author of several books on electrochemistry, and in 1894 he founded the *Zeitschrift für Elektrochemie*, which he edited until 1900.

RECOMMENDATIONS FOR FELLOWSHIP OF THE ROYAL SOCIETY include Dr. F. A. Freeth, Chief Chemist and Director of Research with Brunner, Mond and Co., Ltd. He is specially distinguished for his unrivalled knowledge of the principles and modes of application of the Phase Theory, while during the war he worked out important processes for the production of ammonium nitrate. Dr. J. Kenner, lecturer in Organic Chemistry at Sheffield University, the author of several established theories dealing with the constitution of ring compounds, is also recommended.

THE JUBILEE of Edinburgh University Chemical Society was celebrated on Thursday, February 19, by a supper at Edinburgh. Professor Sir James Walker, F.R.S., presided, and the principal speaker was Sir J. Alfred Ewing, F.R.S.

A LECTURE ON "COLLOIDS" was given last week by Dr. E. B. R. Prideaux, to members of the Chemistry Section of the Leicester Literary and Philosophical Society. The lecturer dealt with the subject of peptising and illustrated the lecture with experiments.

A FINE OF £5 WITH 22S. COSTS has been imposed on the Gas Residual Products Co., Ltd., for failing to provide, for persons employed in distilling tar, the necessary lavatory and bath accommodation and a sufficient supply of clean towels, soap, and nail brushes.

A COLOUR TEST FOR CINEOL was dealt with by Mr. Edwin J. Schorn, Ph.C., A.I.C., at a meeting of the Scottish Pharmaceutical Society on Wednesday, February 18, in Edinburgh. The commercial value of eucalyptus oil, he said, was fixed according to the percentage of cineol, which was determined by precipitation with phosphoric acid. The process was tedious and variable relatively to high or low content, so that results were not strictly comparable. Mr. Schorn found that with ammonium molybdate nitric acid, cineol gave a characteristic blue colour, the intensity of which was proportional to the percentage of cineol in the eucalyptus oil, thus giving a convenient test of commercial value.

THE GREENGATE COLOUR WORKS, LTD., of Manchester, announce that their new works are now in full working order, and are prepared to meet all requirements for the products they manufacture. The disorganisation of a large chemical and dye plant, with its intricate service of pipe lines, is a serious and heavy task, and consequently during the last few months some of the company's friends have had irregular deliveries, and the company thanks all for their forbearance. The new works are many times larger than the old, and new products will be manufactured. The new address of the Greengate Colour Works, Ltd., is Vickers Street, Miles Platting, Manchester. The telegraphic address is altered to "Naphthol, Manchester," but the telephone number, City 7202, remains unaltered.

THE DEATH IS ANNOUNCED of Mr. Francis Milne, of the firm of John R. Rhodes and Co., oil manufacturers, Manchester; of Mr. William Aird, managing director of Turtle and Aird, oil merchants and mill furnishers, of Belfast; of Sir Thomas Allbutt, Regius Professor of Physics at Cambridge and a Past President of the Royal Society; of Mr. F. D. Gibbons, manufacturing chemist, of Wolverhampton, who was in his 87th year, and had served on the Town Council for 52 years; of Professor Walther Dieckmann, of the Department of Chemistry in the University of Munich, whilst carrying out a research in organic chemistry in the State laboratory; of Professor Hildebrand, of the U.S. Bureau of Standards, Washington; of Dr. Wilhelm Borchers, Professor of Metallurgy and Electrometallurgy of the Technische Hochschule of Aix-la-Chapelle.

"THE BACTERIOLOGY OF WATER" was the subject of a paper read by Mr. A. E. Rawson, B.Sc., at a meeting of the Chemical Society of the University of Birmingham on Monday, February 16. At the outset the lecturer outlined the reasons for a bacteriological examination of water and dwelt upon the properties of the indicator organisms, dealing in particular with the viability of streptococci in water. In the consideration of the special requirements of such organisms, it was pointed out that although they all fulfil the conditions laid down, yet the *bacillus coti* group are the most useful. The methods employed in a bacteriological examination of water were then outlined, reference being made to several new media which have been recently introduced with success. Leaving the question of indicator organisms, the examination for such pathogenic bacteria as *B. Typhosus* and *Sp. Cholerae* was dealt with, special reference being made to the concentration and enrichment methods employed. The lecturer pointed out that in the interpretation of results it was necessary to have great experience in the subject and that a good knowledge of the bacterial content of various classes of water supplies was essential. In conclusion, the question of sterilisation by means of filtration and by the addition of chemical reagents, in particular chlorine, was outlined.

## Chemical Matters in Parliament

### Smoke Abatement

MR. N. CHAMBERLAIN (House of Commons, February 19), in reply to a question, stated that the Government contemplated the introduction of an amending Bill when a convenient opportunity arose, but it could not be introduced this year.

### Food Preservation and Colouring

Lieut.-Colonel James (House of Commons, February 19) asked the Minister of Health whether the regulations which he proposed to make to give effect to the recommendations of the Departmental Committee on the use of Preservatives and Colouring Matters in Food would deal with the question of the use of aniline dyes and other synthetic organic colours, chiefly of coal-tar origin, in substitution for annatto and similar natural vegetable matter in the preparation of butter, cheese, and other dairy produce.

Mr. N. Chamberlain referred the speaker to the draft regulations which have just been published.

### German Import Duty (Alsace-Lorraine)

Mr. H. Williams (House of Commons, February 23) asked the Prime Minister whether he was aware that up to January 10 metallurgical products and textiles from Alsace-Lorraine entered Germany free of duty, whereas they were now required to pay the same duty as goods entering Germany from other parts of France; and, seeing that this was likely to result in an increase of goods imported into this country at a price lower than the cost of production, did he propose to initiate immediate measures to counteract the effect of this proceeding upon British manufacturers?

Mr. A. M. Samuel said that the reply to the first part of the question was in the affirmative. As regards the second part, while he doubted whether the results feared were to be expected, in any important degree, he mentioned that where imported goods were being sold, or offered for sale, in the United Kingdom at prices below the foreign cost of production, it was open to the industry affected to apply for the imposition of a duty under the prevention of dumping provisions in Section 2 (1, *a*) of the Safeguarding of Industries Act, 1921.

### Nitrogen Fixation

Mr. Beckett (House of Commons, February 24) asked the Secretary of State for War if any reports of the mission which was, shortly after the Armistice, sent to Oppau to inquire into German methods of fixing nitrogen from the air were available, and whether it was intended to publish them.

Sir L. Worthington-Evans said that a report was made by the British mission which visited the chemical works at Oppau shortly after the Armistice, but it was not proposed to publish the report or any part of it.

### Low Temperature Carbonisation

Mr. G. Hall (House of Commons, February 24) asked the Secretary for Mines whether he was aware that, by processes of low temperature carbonisation, large quantities of oil and other marketable commodities could be extracted from coal; and whether, in view of the serious position of the coal industry in this country at the present time, his Department would frame a scheme for the scientific treatment of raw coal.

Colonel Lane-Fox referred the questioner to a detailed answer given on February 10. (See THE CHEMICAL AGE, February 21.)

### Coke Ovens

Mr. Hannon (House of Commons, February 24) asked the Secretary for Mines the number of coke ovens in use; the quantity of metallurgical coke made in the years 1922, 1923, and 1924; and the amount of coke consumed in blast furnaces for the same years.

Colonel Lane-Fox said that for the years 1922 and 1923 the information was as follows:—

| Year. | Number of Coke Ovens in use. | Metallurgical Coke made. Tons. | Coke consumed in Blast Furnaces. Tons. |
|---|---|---|---|
| 1922 .. | 10,897 | 9,035,741 | 5,819,084 |
| 1923 .. | 12,639 | 13,418,314 | 8,632,600 |

Figues for 1924 were not yet available.

## Brotherton and Co. *v.* Glasgow Corporation

### A Question of Contract Terms

AFTER a long hearing, the First Division of the Court of Session (the Supreme Court of Scotland) gave judgment on Saturday, February 21, in the action Brotherton and Co., Ltd., ammonia and tar distillers, Leeds, *v.* Glasgow Corporation. The dispute arose over the interpretation of a contract under which Brotherton and Co. purchased and dealt with gas residuals produced by the Glasgow Corporation. The contract was entered into in July, 1904, for a period of five years, was later extended for an indefinite period, and was finally terminated in July, 1920. The case first came before Lord Blackburn in the Outer House of the Court of Session, who found for the Corporation, with expenses. Brotherton and Co. appealed to the First Division in the Inner House, and as a result the judgment of the Lord Ordinary in favour of the Corporation was confirmed.

Lord Cullen, who gave the leading judgment, said that it appeared that in 1904 the contract entered into was for five years, and contained a sliding scale of prices unlimited in range. In 1909 a new contract was entered into for five years and to be renewed annually after that period had expired, subject to twelve months' notice.

The salient feature in the case was that between 1909 and May 13, 1920, the parties acted on the footing of the sliding scale of 1909 being the same as that of 1904. The pursuers now said that it was different. They presented two alternative views. The one was that in the event of the average market price of sulphate of ammonia rising to any extent above £13 per ton or falling to any extent below £11 per ton, the range of variation expressly provided for in the contract, the prices to be paid by them were to be the same as for a rise or fall to £13 or £11 respectively. The other view was that a rise above £13 or a fall below £11 per ton on the average market price was not provided for at all by the contract and that a " reasonable price " now fell to be fixed. The defenders, on the other hand, maintained that the parties' course of acting from 1909 to 1920 was in accordance with the true contract between them.

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### Buhler Mills in Soap and Paint Industries

BUHLER BROTHERS, Uzwil, Switzerland, one of the earliest and most successful makers of roller mills for flour mills, the erection and equipment of which comprise the company's principal activities, have, from time to time, designed models of roller mills for use in other branches of manufacture, such as chocolate, paint, soap, etc., where very fine grinding of soft substances is demanded. They claim that the outstanding success achieved by all types of their mills is principally due to the perfection of their rolls, which are made of hard chilled cast iron the manufacture of which is a jealously guarded trade secret of their foundries at Uzwil. It is noteworthy that in all Buhler mills each class of roll is made from a special mixture found after long experience to be best suited for the purpose for which the mill is designed. An examination of the mills, particularly the moving parts and bearings, reveals the care and attention given to the workmanship.

The 5-roller Buhler flake-soap mill is described as very stoutly built to withstand the great strains set up during working. The general design is very attractive; every part, especially the rollers, being highly finished in polished metal or enamel paint. The smooth, noiseless running of the gear pinions and the complete absence of vibration, are notable features. The mill rapidly turns out soap flakes 1/500th of an inch in thickness, and the power consumed is quite moderate. The flakes have a very attractive appearance due to their thinness and highly polished surfaces; and it is obvious that soap in such extremely fine division readily dissolves in warm water, an advantage which naturally appeals to the housewife.

For refining perfumed soaps the firm have designed a 3-roller mill of which the rolls, as in the larger type, are prevented from overheating by an interior circulation of cold water. By this means the soap film on the rolls is kept cool and consequently there is no danger of the delicate perfume essences being volatilised and driven off. This model has a two-compartment feed hopper from which the soap may be passed any number of times in succession through the rolls. This mill is also used for making flakes of a thicker variety than those made on the 5-roller mill.

Both the 5-roller and the 3-roller mills are also particularly suitable for grinding white lead, white zinc, and ordinary paints, and if one may judge from unsolicited testimonials from paint manufacturers, Buhler Brothers have many satisfied clients who are obtaining large outputs of very finely ground materials on their mills. The firm offer their clients the free services of an expert erector who sees that each mill is correctly installed, after which he runs a test for guaranteed output in the presence of the purchaser; and before he leaves the works the erector satisfies himself that the man taking charge of the mill is fully acquainted with its running and maintenance.

The representative for England is Mr. F. de M. Tubman, Temple House, Tallis Street, London, E.C.4.

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### The Advantages of Mechanically Slaked Lime

OF considerable importance for water softening, and to a greater or less degree for almost all the multitudinous uses of lime, is the fact that the Buxton Lime Firms, Ltd., have now placed on the market an extremely pure form of slaked lime or calcium hydrate. This is prepared only from the fine old Buxton lime by mechanical slaking, giving a high-grade product in an exceedingly fine powder impossible to obtain by hand methods, with all the stones and impurities eliminated, containing less than 0·25 per cent. moisture, no free lime, and only the merest trace of unslakable material.

Consequently lime can now be weighed out in a convenient manner and mixed with water without the necessity of sieving, just as accurately as the soda ash itself, giving a reagent liquor for the softening plant of absolutely constant composition in a manner which is impossible with the use of commercial quicklime. This latter is a very irregular product, much more so than is commonly imagined. In the first place it contains mineral impurities derived from the original limestone, such as clay and calcium silicate formed in the burning, whilst also there may be magnesia present. Then it often becomes partially slaked by exposure, and for the same reason forms also calcium carbonate, so that 100 parts by weight of commercial lime may easily be only 90 to 95 parts of actual lime (CaO), the chief difficulty being that the latter figure is indeterminate. Also it is necessary to sieve the cream every time, a troublesome operation, whilst a further complexity is often the presence of " dead-burnt " lime that does not slake properly. The result is, therefore, that the reagent liquor does not contain a uniform percentage of lime, as required by the automatic feed gear mechanism, which is a volume measurer, so that it is impossible to work the softening plant to the best advantage and obtain a continuous figure of, say, 4° to 5° hardness.

Mechanically slaked lime also has other advantages in practice, such as, for example, that it is much more stable in the air and can therefore be stored in large quantities in standard bags and handled conveniently without any wastage, whilst it is very little more in net cost than the ordinary irregular lumps of lime, quite apart from the extra convenience and accuracy that results from its use.

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### Manufacturing Chemist's Failure

WILFRED FRANK NICHOLSON, manufacturing chemist, of Ewelme Road, Forest Hill, underwent his public examination at the Greenwich Bankruptcy Court on Tuesday, February 17. He was formerly the managing director of the firm of Parker and Lester, at a salary of £500 a year. Subsequently the firm of Parker and Lester went into liquidation, and a writ was issued against him for £1,069. He counter-claimed for £1,700, salary as secretary to the company, a position he held in conjunction with that of managing director. The matter came before the Official Receiver, who gave judgment in the firm's favour for £947, and it was for that that the liquidator issued the bankruptcy notice in 1924. Mr. Nicholson was later associated with several company promoting schemes. The examination was adjourned.

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# Patent Literature

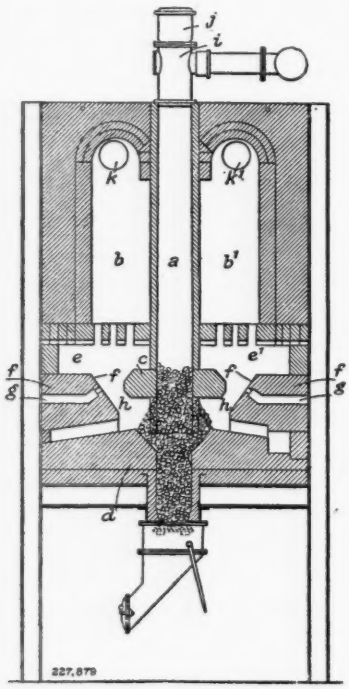
## Abstracts of Complete Specifications

227,874. Medical Preparations Containing Arsenic, Manufacture of. W. J. Mellersh-Jackson, London. From Ostro-Products Corporation of America, 15, Exchange Place, Jersey City, N.J., U.S.A. Application date, July 18, 1923.

It has been found that the toxicity of arsenic oxygen compounds (*i.e.*, compounds containing arsenic and oxygen directly linked together) can be reduced and the therapeutic effects can be increased by using 4 : 4′-dioxy-3 : 3′-diamino-arsenobenzol hydrochloride, or sodium 3 : 3′-diamino-4 : 4′-dihydroxy-arsenobenzol-N-methylene sulphinate as protective colloids for the arsenic oxygen compounds. In an example, para-oxymetamino-phenyl-arsenious oxide is dissolved with 4 : 4′-dioxy-3 : 3′-diamino-arsenobenzol hydrochloride, the solution precipitated by ether, and the precipitate dried and dissolved in water. In another example, a solution of 4 : 4′-dioxy-3 : 3′-diamino-arsenobenzol hydrochloride is partly oxidised and precipitated by ether as before. Several other examples are also given.

227,879. Distillation of Carbonaceous Substances. E. R. Sutcliffe, 93, Church Street, Leigh, Lancashire. Application date, July 25, 1923.

In this process steam is decomposed to produce combustible gas, which is partly used for heating the charge to be distilled, and partly used for heating one of a pair of generators which are employed for superheating the steam before its admission

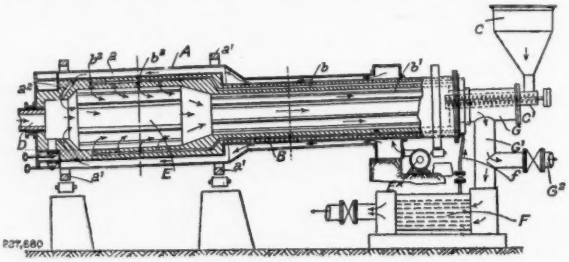



to the charge. A number of rectangular firebrick retorts *a* are arranged in line in a setting, and a corresponding series of heating chambers *b*, *b′* are arranged on both sides of the retorts. The retort is supported on a firebrick bridge *c* immediately over a receptacle formed in the lower part *d* of the setting. The upper part of the receptacle is flared outwards so that the charge may accumulate in it. Combustion chambers *e*, *e′* are provided below the heating chambers *b*, *b′*, and the brickwork *f* contains air conduits *g* which open into narrow spaces *h* between the brickwork *f* and bridge *c*. The heating chambers may be provided with the usual reticulated brickwork.

The coal is fed through the hopper *j* into the retort, and gas is drawn off through the pipe *i*. Steam is admitted at *k′* to the heater *b′* and raised to 850° C. and then passes through the combustion chamber *e′* and space *h* into the charge below the retort. Part of the products of decomposition of the steam pass upwards through the charge in the retort to distil it, and the gases are drawn off at the top. Another part of the combustible gas passes into the chamber *e* and is burned with air supplied through the conduits *g*. The hot gases pass upwards into the heater *b* so that the brickwork becomes heated, and also the retort *a* by conduction. After a period, the steam supply is transferred to the heater *b*, and the combustion products are passed into the heater *b′* to reheat it. The temperature of distillation may be varied, *e.g.*, it may be reduced to 750° C., and an excess of steam used if it is desired to obtain the maximum quantity of oils and tar. If a maximum gas production is desired, the temperature may be raised to 1,200° C.

227,880. Gasification and Distillation of Carbonaceous Materials. H. Nielsen, 13, Firs Avenue, Muswell Hill, London, and B. Laing, Abdale House, Hatfield, Herts. Application date, August 17, 1923.

This apparatus is of the kind in which the material to be treated is powdered and fed at one end of a rotary retort and carried forward into contact with hot gases generated by the combustion of powdered fuel and air at the opposite end of the retort. The retort A is provided with a firebrick lining B leaving a space *a* between them to preheat the air before it enters the retort. Passages *b* are formed in the inner refractory lining, through which steam is passed and superheated before entering the retort through passages $b^2$. The retort is inclined from inlet to outlet, and provided with runner bands $a^1$. The powdered fuel to be treated is supplied from a hopper C by a conveyor $C^1$, and is agitated by means of shelves $b^1$ on

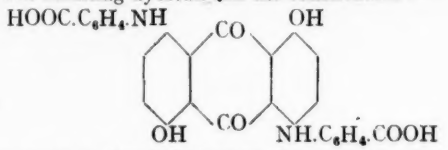



the sides of the retort. The powdered fuel is blown in at D, and the supply of air is injected by the blower $E^x$, preheated in the passage *a* and delivered to the combustion chamber E through passages $a^3$. The gases leave the retort through passage G, and thence to the outlet $G^2$, or a part of the gases may be passed through a waste heat boiler F, which supplies steam through a pipe *f* to the heating passages *b*, and thence through the openings $b^2$, into the retort. Alternatively, all or some of the passages $b^2$ may be used for admitting secondary air instead of steam. The powdered fuel is blown in at D at a sufficient speed to keep the solid particles in suspension. As the combustion gases are not required to carry the fuel forward, their speed need not be high, and very little unconsumed carbon is carried forward through the condensing plant. The fuel from the hopper C passes forward through zones of gradually increasing temperature, and a long duration of contact is obtained. To produce illuminating gas, the apparatus is constructed in two sections. In the first section, powdered fuel is distilled by the sensible heat of water gas and the partly carbonised fuel then fed into the next section where it meets the combustion gases. The retort may also be used for the reduction of ores by introducing the ore and powdered fuel at one end of the retort, and blowing in air and powdered fuel at the other end of the retort. The retort may also be employed in a similar manner for the treatment of sewage.

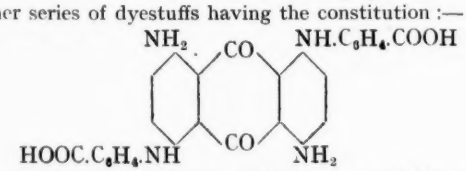
227,923. New Dyes of the Anthraquinone Series. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester, J. Baddiley, Crumpsall Vale Chemical Works, Blackley, Manchester, and W. W. Tatum, Dalton Works, Huddersfield. Application date, October 25, 1923.

Dyestuffs suitable for dyeing acetyl silk are obtained by

condensing 4 : 8-dihalogen anthrarufin with an aminobenzoic acid. The resulting dyestuff has the constitution :—



Another series of dyestuffs having the constitution :—



are obtained by condensing 4 : 8-dinitro-1 : 5-dichlor-anthraquinone with an aminobenzoic acid, and reducing the nitro group. These dyes will dye acetyl silk directly, and are also acid wool colours. The shades range from blue to green. Examples are given of the condensation of 4 : 8-dichlor-anthrarufin and anthranilic acid to obtain a greenish blue dyestuff. Also the condensation of 4 : 8-dinitro-1 : 5-dichloranthraquinone with anthranilic acid, and the reduction of the product to obtain another greenish-blue dyestuff. A greener shade of dyestuff may be obtained by increasing the temperature of condensation, or by introducing a substituting group into one of the amino groups in the 4- or 8-position, *e.g.*, a partial substitution of the nitro group by anilino group is obtained by heating with aniline prior to reduction.

227,924. Recovery of Organic Acidic Substances from Matter of Vegetable Origin. H. Wade, London. From W. A. Fraymouth, and The Bhopal Produce Trust, Ltd., of Bhopal, Bhopal State, India. Application date, October 25, 1923.

This process is for the recovery of organic acids or soluble salts from vegetable matter containing colloidal or cellulosic substances. It is applicable to the treatment of plants of the opuntia genus which contain both oxalic acid and insoluble calcium oxalate. In this case, the material may be pulped and the soluble matter separated by expressing. The precipitating reagent is added to the separated solution, the liquor filtered off, and the precipitate and insoluble matter mixed and made into a freely flowing pulp. The precipitate and the natural organic salts are then separated by a process employing surface tension phenomena, *e.g.*, froth flotation. The precipitating reagents employed include calcium and/or barium hydrates or carbonates, chlorides, or similar salts of copper.

In an example, opuntia pulp is first treated to separate the solid matter by expression. This solid matter, consisting of fibres and calcium oxalate, is made into a pulp with 20 times its weight of water. The expressed liquid is treated with calcium hydrate to precipitate calcium oxalate, which is filtered off together with mucilaginous or other colloidal matter. This is added to the pulp containing the natural oxalate, and tannin is then added in the proportion of 0·25–2 lbs. of solid tannin per ton of pulp. The pulp is then fed to a froth flotation machine, together with about 0·5–2 lbs. of oil per ton of oxalate recovered. When the pulp is frothed the calcium oxalate rises, and can be collected and dried, the process may also be applied to the recovery of citric acid and tartaric acid, a copper salt being used in the latter case to precipitate insoluble copper tartrate. In some cases the pulp may be allowed to ferment. The process is also applicable to the treatment of tamarind for the recovery of citrates or tartrates, and to the treatment of wine lees for the recovery of citric acid.

227,925. Recovery of Oxalic Matter from Natural Products. H. Wade, London. From W. A. Fraymouth, and The Bhopal Trust Produce, Ltd., of Bhopal, Bhopal State, India. Application date, October 25, 1923.

This is a process for obtaining insoluble oxalate from the organic materials referred to in Specification No. 227,924 above. The material is made into a pulp with water, and the liquid containing the soluble materials is filtered off. The undissolved matter is made into a second pulp with a further quantity of water and then subjected to froth flotation. The separation is assisted by adding a small proportion of tannin, or an alkali such as soda before subjecting to flotation. The flotation is carried out in a series of cells using different frothing agents in succession, *e.g.*, soda with a small quantity of oil, then eucalyptus oil, and finally a gas from volatile oils. The details of the process are similar to those described in Specification No. 227,924 above.

228,073. Collecting Electrodes for Use in the Electrical Precipitation of Suspended Particles from Gases. Lodge-Cottrell, Ltd., 51, Great Charles Street and Church Street, Birmingham. From Metallbank und Metallurgische Akt.-Ges., 45, Bockenheimer Anlage, Frankfurt-on-Main, Germany. Application date, July 28, 1924.

Collecting electrodes for receiving deposits of suspended particles from gases may be made of concrete or other semi-conductor, and in this invention the electrode may be built up to any desired size from individual elements without internal reinforcement which has usually been considered necessary. The elements are loosely supported by a frame which does not form part of the electrode. The elements are provided with projections or ridges arranged transversely to the direction of flow of the gas.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention : —205,833 (Australian Lanoline Proprietary, Ltd.), relating to separation of oily or fatty substances from liquids, see Vol. IX, p. 693; 210,402 (M. C. J. E. de Loisy, and E. Grauce), relating to apparatus for destructive distillation, see Vol. X, p. 334; 215,716 (Soc. Ricard, Allenet et Cie), relating to the continuous dehydration of organic liquids, see Vol. XI, p. 70.

## International Specifications not yet Accepted

226,767. Purifying Fats and Oils. K. F. Wilhelm, Straalsund, Germany. International Convention date, December 24, 1923.

Fats and fatty oils are purified by heating with a mixture of alcohol 50–90%, water 4–50%, and ammonia 3%. The fatty acids, resins, etc., are dissolved, but not the neutral fats.

226,783. Krypton and Xenon. Soc. Anon. d'Eclairage et d'Applications Electriques, Boulevard de la Scarpe, Arras, France. International Convention date, December 26, 1923.

Liquid oxygen obtained from air is evaporated, and the gases passed through a vessel containing absorbent charcoal which is cooled by liquid oxygen. Krypton and xenon are obtained.

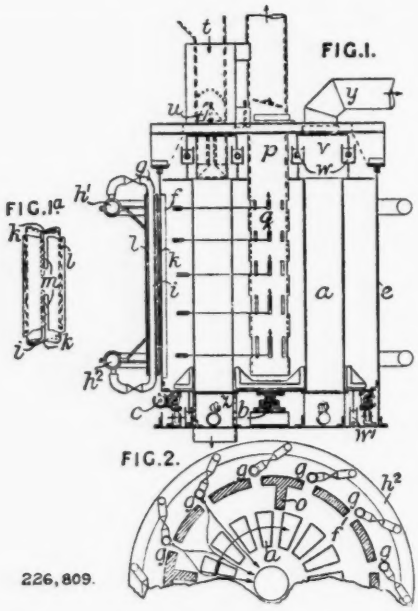
226,797. Dyes. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, December 28, 1923.

3-oxynaphthalene-1 : 8-dicarboxylic acid is coupled with diazo compounds to obtain azo dyes. The mordant character of the products can be increased by selection of the diazo compound. Copper or chromium compounds may also be obtained. Examples are given of the production of dyes from the coupling component and the diazo compounds of aniline, 1-oxy-2-aminobenzene-4-sulpho-6-carboxylic acid, and the nitrated diazo compound of 1-amino-2-oxynaphthalene-4-sulphonic acid respectively. The dyestuff from diazotized 4-chlor-2-aminophenol is converted into a chromium compound by boiling with chromium oxide, caustic potash, and glycerine. The dyestuff from nitrated 1-diazo-2-oxynaphthalene-4-sulphonic acid may similarly be boiled with chromium fluoride. Particulars are given of the results obtainable with dyestuffs from the coupling component and the diazo compounds of the following components :—*p*-nitraniline, *o*- and *m*-aminobenzoic acid, 5-nitro- and 5-sulpho-3-aminobenzoic acid; the 4-chlor-, 4-nitro-, 5-nitro-, 4 : 6-dinitro-, 4-methyl-, 6-nitro-, 4-sulpho-, 4-methyl-6-sulpho-, 4-chloro-6-sulpho-, 4-nitro-6-sulpho-, and 6-nitro-4-sulpho-derivatives of 2-amino-1-phenol; the 4-sulpho-, 4-chloro-, and 4-nitro-derivatives of 2-amino-1-phenol-6-carboxylic acid; 2-amino- and 6-nitro-2-amino-1-phenol-4-carboxylic acid, 4-amino-phenol-6-carboxylic acid; and benzidine, tolidine, and dianisidine.

226,809. Low Temperature Distillation. A. Besta, 160, Karl Lehrstrasse, Duisburg, Germany. International Convention date, December 24, 1923.

A vertical drum *e* mounted on a pivot *b* contains a number of

cells *a*. Each all receives a charge from the shaft *t*, and the charge is compressed by a device *u*. Slots *f* are formed in the drum, each having a burner tube *g* supplied from circular pipes $h^1$, $h^2$. The burners have an inner tube *i* with slots *k*, and an outer tube *l* having a serrated slot *m*, so that the slots *k* can be controlled by rotating the tube *l*. The cells *a* are




surrounded by a heating space which is subdivided by radial partitions *o*, so that on rotation of the drum by gearing *c*, the charges can be heated to different temperatures. The hot gases pass around the cells *a* to the central slotted flue *p*, and thence around the hopper *t* to preheat the fuel. The distillates pass into an annular space *v* and thence to an outlet *y*. Burners *z* are also provided below the bottom plate, and tar seals *w*, $w^1$ to prevent leakage.

226,819. ALKALI ALUMINO-SILICATES, DECOMPOSING. F. Jourdan, 3, Piazza del Popolo, Rome. International Convention date, December 28, 1923.

Silicates containing alkali metals and aluminium, *e.g.*, leucite, are treated at a high temperature with lime or limestone to produce alkali aluminate. The melt is cooled slowly and cast in large lumps, which readily break up and yield a large proportion of soluble alkali aluminate. Iron carbonate or ferric oxide and coal may be added to the mix to facilitate melting. Any carbon dioxide evolved may be employed to precipitate alumina from the solution of alkali aluminate. Potassium compounds are recovered from the flue gases.

226,824. HYDROCYANIC ACID. Deutsche Gold-und Silver-Scheideanstalt vorm. Roessler, Frankfurt-on-Main, Germany. International Convention date, December 2, 1922.

Hydrocyanic acid is produced from carbon monoxide and ammonia at pressures above atmospheric, in the presence of a catalyst. The pressure is released beyond the catalyst to cool the reaction mixture as soon as possible.

LATEST NOTIFICATIONS.

220,272. Manufacture of alcohol or ether from ethylsulphuric acid. Compagnie de Bethune. February 11, 1924.

229,282. Process for the production of phosphorus, phosphorus pentoxide, and phosphoric acid. Chemicshe Fabrik Griesheim-elektron. February 11, 1924.

229,283. Process of purifying oils and fats by means of soda. Metallbank-und Metallurgische Ges. February 15, 1924.

229,298. Process for the manufacture of ethyl chloride. Dr. H. Suida. February 11, 1924.

229,330. Manufacture of new azo dyestuffs. Farbenfabriken vorm. Bayer and Co. February 13, 1924.

229,334. Manufacture of chlorine. Rhenania Verein Chemischer Fabriken Akt.-Ges. February 15, 1924.

## Specifications Accepted with Date of Application

206,836. Rustless iron and similar alloys, Processes of making. Electro Metallurgical Co. November 13, 1922.

220,655. Gases bearing gaseous synthetic ammonia, Process and apparatus for treating. Synthetic Ammonia and Nitrates, Ltd. August 16, 1923.

228,582. Active carbons, Process for the production of. H. E. Potts. (*Naamlooze Vennootschap Algemeene Norit Maatschappij*.) August 9, 1923.

228,588. Hypochlorite compositions. P. C. Rushen. (*Mathieson Alkali Works, Inc.*) October 1, 1923.

228,595. Mercurial phenols, Manufacture of. A. Klages and Saccharin-fabrik Akt.-Ges. vorm. Fahlberg, List and Co. October 10, 1923.

228,624. Filters. J. C. Betteridge and H. J. Cox. November 7, 1923.

228,628. Peat, and the like, Removal of water from. O. Soderlund, T. Boberg, N. Testrup, and Techno-Chemical Laboratories, Ltd. November 7, 1923.

228,633. Sulphuric anhydride, Process and apparatus for the preparation of—by contact, by means of vanadium salts. P. Audianne and G. Bachalard. November 8, 1923.

228,646. Sulphuric acid, Process for condensing the acid fumes evolved during concentration of. Chance and Hunt, Ltd., and W. A. S. Calder. November 10, 1923.

228,661. Liquid hydrocarbons, Apparatus for the treatment of. S. J. M. Auld, A. E. Dunston, and P. H. Herring. November 29, 1923.

222,815. Oolitic and other iron ores, Process for concentrating. P. Gredt. October 3, 1923.

228,691. Evaporation and concentration of liquors. A. Blair, and Blair, Campbell, and McLean, Ltd. January 12, 1924.

228,741. Tricalcium saccharates, Process and apparatus for the precipitation of. C. Steffen, Junr. April 1, 1924.

228,749. Distilling carbonaceous materials, Apparatus for. C. A. Griffiths. April 15, 1924.

228,763. Carbonisation of solid fuel, Process of and apparatus for. J. Rude. May 23, 1924.

228,771. Aromatic hydrocarbons, Oxidation of. E. B. Maxted and B. E. Coke. June 4, 1924.

228,812. Active carbon of increased adsorbing capacity, Process of manufacturing. H. E. Potts. (*Naamlooze Vennootschap Algemeene Norit Maatschappij*.) August 9, 1923.

228,814. Suspended matter, Treatment of solutions for separation of. C. Weizmann and J. Blumenfeld. August 3, 1923.

228,832. Volatile fatty acids, Process for the dehydration of E. Coppée. November 6, 1923.

228,747. Solutions, emulsions, and suspensions, Method and device for evaporating the volatile constituents of. F. Wreesmann. April 14, 1924.

## Applications for Patents

Badische Anilin-und Soda-Fabrik and Johnson, J. Y. Manufacture of vat colouring-matters. 4,489. February 18.

Balke, P. Production of plastic masses from cellulose derivatives. 4,501. February 18. (Germany, February 18, 1924.)

British Cyanides Co., Ltd., Cooper, C. H., and Rossiter, E. C. Manufacture of synthetic gums, etc. 4,784. February 20.

Deperrois, E. D. Carbonising and distillation plant for wood, etc. 4,744. February 20. (France, February 20, 1924.)

Dickens, C. Chemical product. 4,765. February 20.

Farbenfabriken vorm. F. Bayer and Co. Manufacture of dyestuffs. 4,422. February 17. (Germany, February 18, 1924.)

Farbenfabriken vorm. F. Bayer and Co. Plant protection media. 4,785. February 20. (Germany, February 20, 1924.)

Farbenfabriken vorm. F. Bayer and Co. Manufacture of azo dyes. 4,786. February 20. (Germany, February 28, 1924.)

Farbwerke vorm. Meister, Lucius, and Brüning and Imray, O. Y. Manufacture of vat dyestuffs. 4,313. February 16.

Haco-Gas. Akt.-Ges. Bern and Rushen, P. C. Production of albumen dyestuff products, etc. 4,647. February 19. (November 30, 1923.)

Haco-Gas. Akt.-Ges. Bern and Rushen, P. C. Production of albumen dyestuffs products, etc. 4,749. February 20. (June 21, 1924.)

Hawlik, H., and Sindl, O. Production of alkali cellulose. 4,525. February 18. (Czecho-Slovakia, February 18, 1924.)

Leysieffer, G. Production of plastic masses from cellulose derivatives. 4,501. February 18. (Germany, February 18, 1924.)

Norsk Hydro-Elektrisk Kvælstofaktieselskab. Process for separating compounds of potassium from compounds of aluminium. 4,367. February 17. (Norway, February 27, 1924.)

Pirbright Co., Ltd. Apparatus for separating liquids. 4,510. 4,511. February 18.

Pirbright Co., Ltd. Centrifugal separators. 4,512. February 18.

Salerni, E. M. Distillation, etc., of carbonaceous, etc., materials. 4,365. February 17.

Tyrer, D. Manufacture of fertilisers. 4,659. February 19.

# London Chemical Market

*The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

*London, February 26, 1925.*

BUSINESS has been quietly steady during the past week, and is generally without special feature. There has not been quite so much export inquiry.

### General Chemicals

ACETONE is lower in price but in fairly steady demand. The figure to-day is £75 per ton, ex wharf London.

ACID ACETIC.—There has been a small amount of realisation by weak holders. The makers, however, hold firmly to their prices and are reluctant to meet second-hand competition. Price to-day is £41 per ton for technical 80%, and £42 per ton for pure acetic 80%.

ACID CITRIC remains a firm market at 1s. 5d. per lb.

ACID FORMIC is in fair request, price unchanged at £52 per ton for 85% technical.

ACID LACTIC is steady, without alteration in price; £43 per ton is quoted for 50% by weight.

ACID OXALIC.—The advance in price has been maintained. There is comparatively little in second hands. A further improvement is not unlikely. Price 3¾d. per lb.

ACID TARTARIC.—The market is moving with the progress of the season. A definite advance in price is likely.

ARSENIC.—The price continues quiet in the passing of business. The tendency is decidedly in buyers' favour.

BARIUM CHLORIDE is somewhat lower in price, due apparently to the advent of new competition. Price is nominally £9 15s. to £10 per ton.

COPPER SULPHATE is unchanged.

CREAM OF TARTAR is inclined to be firmer, price varying from £75 to £78 per ton according to make and position.

EPSOM SALTS are expected to advance in price. There is considerable inquiry in the market.

FORMALDEHYDE.—There is a fair demand, although buyers hold out until the last moment, expecting a further decline in the market. Spot price is £43 per ton.

LEAD ACETATE has been in good demand. Price unchanged at £46 10s. per ton for white and £44 for brown.

LEAD NITRATE is unchanged.

LIME ACETATE is without special feature.

METHYL ALCOHOL.—Demand is a little more active. Price seems to have touched bottom at about £50 per ton for pure grade.

POTASH CAUSTIC AND CARBONATE are unchanged.

POTASH PERMANGANATE.—A fair number of transactions are reported, but they are of small dimensions. Price 7½d. per lb.

POTASH PRUSSIATE is firm at 8d. to 8½d. per lb.

SODIUM ACETATE is unchanged at £22 to £23 per ton.

SODIUM HYPOSULPHITE is unchanged.

SODIUM PRUSSIATE.—There is a small amount of attempted realisation owing to lack of demand. Makers, however, will not budge from their recent quotations. Price 4¼d. to 4⅜d. per lb.

### Coal Tar Products

The changes from last week in the market for coal tar products are slight.

BENZOL 90% is still in good demand, and the price has a continued upward tendency, the values being from 1s. 10½d. to 1s. 11d. per gallon on rails.

PURE BENZOL is valued at about 2s. 1d. per gallon on rails.

CREOSOTE OIL is quieter. Little fresh business is reported, and prices have an easier tendency. Values to-day are from 6¼d. to 6½d. per gallon on rails in the north, and 7¼d. to 7½d. per gallon on rails.

CRESYLIC ACID remains unchanged from last week, and is quoted at 1s. 10d. per gallon on rails in bulk for the pale quality 97/99%, while the dark quality 95/97% is valued at about 1s. 7d. per gallon on rails.

SOLVENT NAPHTHA is in good demand, and the price has an upward tendency. Values to-day are 1s. 4d. to 1s. 4½d. per gallon on rails.

HEAVY NAPHTHA has no great demand, and the value remains unchanged at about 1s. 1d. to 1s. 2d. per gallon on rails.

NAPHTHALENES are still dull, the lower grades being quoted at £4 5s. to £4 15s. per ton. The higher quality 76/78° is quoted at £6 to £6 10s. per ton, and the 74/76° quality is valued at £5 10s. to £6 per ton.

PITCH is in somewhat better demand, and the market is slightly firmer. To-day's quotations are 42s. 6d. to 45s. f.o.b. London and main U.K. ports.

## Nitrogen Products Markets

*Export.*—During the past week there has been no change in the export position. Producers are disposing of the quantities available at about £13 15s. per ton, f.o.b., and it is expected that later in the season the market may be a little firmer.

*Home Trade.*—The early February demand has been somewhat disappointing on account of the very wet season. However, during the last few days the home orders have been very heavy and it is anticipated that the home deliveries for March and April will be heavier than ever before.

*Nitrate of Soda.*—The nitrate of soda market is unchanged, prices still ranging from £11 15s. to £11 18s. for February/March shipment.

## American Market Movements

(From *Drug and Chemical Markets.*)

STEADY position is maintained in industrial chemicals. Prussiates unchanged. Sodium sulphide supplies in firm hands. Aluminium sulphate firm. Benzene much steadier. Other light oils firm. Intermediates generally steady and prices maintained on all products. Demand greatly increased. Linseed oil lower and generally unsettled. Vegetable oils continue quiet, although slight improvement is noted. Animal oils show no improvement. Fish oils in fairly good request.

Fine chemical prices holding steady, which would indicate firm position of sellers. Menthol stronger and mercury easier.

## The German Chemical Market

(FROM A CORRESPONDENT)

THERE is no particular increase in activity to report. Quotations for caustic potash are unchanged, larger lots being offered at $14.50. Firm orders in caustic soda were carried out on a basis slightly under the last quotation, owing to lower inland price. Exceptional offers for chloride of magnesium for India were on the market, and this article could be bought in lots from 100 tons upwards at £3 5s. In chlorate of potash as well as chlorate of soda offers from works were not on hand, and lots in second-hand were not worth mentioning, which explains the price of $11. Yellow prussiate of potash was weaker on the whole, making business possible at £68. As a rise in potassium, advertised during the last few days, will most probably come into force soon, all products of this article may be expected to touch a higher price. Carbonate of potash was further in strong demand, and transactions were carried out on a basis of $11. The price for sulphide of sodium remains unchanged. Quotations from works for tartaric acid were higher, but goods are still available second-hand at $47. Prices for oxalic acid were fixed by manufacturers as follows:—in original casks, £23; 100 kg. casks, £23; and 50 kg. kegs, £24 per ton. Quantities already in trade were offered at about £1 below these quotations.

### Belgian Chemical Works Closing Down

MANY Belgian chemical manufacturers, becoming tired of selling under cost price, have closed their works and others have curtailed in order to stimulate demand, according to *Drug and Chemical Markets.* Prussiate of potash, which has been as low as £57 per ton during 1924, has become quite scarce owing to manufacturers withholding sales. Nominal prices range between £72 and £75 per ton of 1,000 kilos. It is said that the price will go up, as producers say no profitable business can be done under £75 to £80 per ton. Several Belgian plants have closed down, some producers finding it more profitable to sell crude Glauber salt than to transform it into the sulphide.

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at retailers' works.*

## General Heavy Chemicals

Acid Acetic, 40% Tech.—£21 to £23 per ton.
Acid Boric, Commercial.—Crystal, £45 per ton, Powder, £47 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d.; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chloride (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 7d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d. Normal business.
Nickel Ammonia Sulphate.—£38 per ton d/d. Normal business.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5½d. per lb.
Potassium Chlorate.—3d. to 4d. per lb.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4½d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 to £18 per ton, according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—2½d. to 3½d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphide conc. solid. 60/65.—About £15 per ton d/d. Contract £14 15s. Carr. pd.
Sodium Sulphide Crystals.—£9 5s. per ton d/d. Contract £9 2s. 6d. Carr. pd.
Sodium Sulphide, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

## Coal Tar Products

Acid Carbolic Crystals.—5½d. to 5¾d. per lb. Quiet demand. Crude 60's, 1s. 7d. to 1s. 8d. per gall. Little demand.
Acid Cresylic 97/99.—1s. 9d. to 2s. per gall. Pale, 95%, 1s. 7d. to 1s. 10d. per gall. Dark, 1s. 7d. to 1s. 10d. per gall. Markets quiet.
Anthracene Paste 40%.—4d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7d. to 8d. per gall. Unstrained, 6d. to 7d. per gall.
Benzol.—Crude 65's.—9d. to 11½d. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 1s. 11d. per gall., ex works in tank wagons. Supplies very scarce.
Toluol.—90%, 1s. 7d. to 1s. 7½d. per gall. More inquiry. Pure, 1s. 11d. to 2s. per gall. Steady demand.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. to 9d. per gall. Better demand. Middle Oil, Heavy, Standard specification, 6d. to 7d. per gall., according to quality and district. Market firmer. Steady demand.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 3d. to 1s. 7d. per gall. Demand good. Solvent 90/190, 11½d. to 1s. 1d. per gall. Steady business.
Naphthalene Crude.—Demand rather better. Cheaper in Yorkshire than in Lancashire. Drained Creosote Salts, £3 to £5 per ton. Demand rather better. Whizzed or hot pressed, £6 to £9 per ton.
Naphthalene.—Crystals and Flaked, £12 to £15 per ton, according to districts.
Pitch.—Medium soft, 40s. to 45s. per ton, according to district. Not much business.
Pyridine.—90/160, 18s. to 18s. 6d. per gall. Not much demand. Heavy, 11s. to 12s.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid H.—3s. 9d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—1s. per lb. Price reduced. Improved demand.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—8d. per lb. naked at works.
Aniline Salts.—8d. per lb. naked at works
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s. 8d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
*p*-Chlorphenol.—4s. 3d. per lb. d/d.
*p*-Chloraniline.—3s. per lb. 100% basis.
*o*-Cresol 29/31° C.—3d. to 3½d. per lb. Demand quiet.
*m*-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
*p*-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
*p*-Dichlorbenzol.—£85 per ton.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. 2d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
Monochlorbenzol.—£63 per ton.
*a*-Naphthol.—2s. 3d. per lb. d/d.
*B*-Naphthol.—1s. per lb. d/d.
*a*-Naphthylamine.—1s. 3½d. per lb. d/d.
*B*-Naphthylamine.—3s. 9d. per lb. d/d.
*m*-Nitraniline.—4s. 2d. per lb. d/d.
*p*-Nitraniline.—2s. 2d. per lb. d/d.
Nitrobenzene.—5½d. to 5¾d. per lb. naked at works.
*o*-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronapthalene.—10d. per lb. d/d.
*p*-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
*p*-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
*m*-Phenylene Diamine.—4s. per lb. d/d.
*p*-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
*o*-Toluidine.—10d. per lb.
*p*-Toluidine.—2s. 4d. per lb. naked at works.
*m*-Toluylene Diamine.—4s. per lb. d/d.

## Wood Distillation Products

Acetate of Lime.—Brown £11 to £11 5s. per ton d/d and upward. Quiet market. Grey, £15 to £15 10s. per ton. Firmer. Liquor, 9d. per gall. 32° Tw.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Fair demand.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 9d. per gall. 60% O.P. Solvent, 5s. per gall. 40% O.P.
Wood Tar.—£3 5s. to £4 per ton. Demand slack and stocks being held.
Brown Sugar of Lead.—£44 per ton. Steady market.

## Rubber Chemicals

Antimony Sulphide.—Golden, 5¾d. to 1s. 4d. per lb., according to quality. Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality
Arsenic Sulphide, Yellow.—1s. 11d. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—3s. 9d. to 4s. 3d. per lb., according to quantity.
Carbon Bisulphide.—£30 to £33 per ton, according to quantity.
Carbon Black.—6d. to 6½d. per lb., ex wharf.
Carbon Tetrachloride.—£62 10s. to £67 10s. per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—5d. to 9½d. per lb. Demand very brisk. Prices likely to remain steady owing to firmness of rapeseed oils.
Lamp Black.—£48 per ton, barrels free.
Lead Hyposulphite.—7½d. per lb.
Lithopone, 30%.—£22 10s. per ton.

**Mineral Rubber** "Rubpron."—£16 5s. per ton f.o.r. London.
**Sulphur.**—£10 to £12 per ton, according to quality.
**Sulphur Chloride.**—4d. per lb., carboys extra.
**Sulphur Precip. B.P.**—£56 to £65 per ton.
**Thiocarbanilide.**—2s. 6d. per lb.
**Vermilion, Pale or Deep.**—5s 6d. per lb. Dearer.
**Zinc Sulphide.**—7½d. to 1s. 8d. per lb., according to quality.

## Pharmaceutical and Photographic Chemicals

**Acid, Acetic 80% B.P.**—£45 per ton ex wharf London in glass containers.
**Acid, Acetyl Salicylic.**—2s. 11d. to 3s. 1d. per lb., according to quantity. Sales steady. Price firm.
**Acid, Benzoic B.P.**—2s. 6d. per lb.
**Acid, Boric B.P.**—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.
**Acid, Camphoric.**—19s. to 21s. per lb.
**Acid, Citric.**—1s. 4½d. per lb., less 5% for ton lots. Raw materials dearer, equal to ½d. per lb. on finished product.
**Acid, Gallic.**—2s. 9d. per lb. for pure crystal, in cwt. lots. Easier.
**Acid, Pyrogallic, Crystals.**—6s. per lb. for 1 cwt. lots. 7s. 6d. per lb. for 7-lb. lots according to quantity. Steady market.
**Acid, Salicylic.**—1s. 5d. to 1s. 6d. per lb., according to quantity. Steady market.
**Acid, Tannic B.P.**—2s. 9d. per lb. Quiet steady demand.
**Acid, Tartaric.**—1s. 1d. per lb., less 5%. Very firm. Demand good.
**Amidol.**—9s. per lb., d/d.
**Acetanilide.**—1s. 10d. to 2s. per lb. More inquiry.
**Amidopyrin.**—14s. 6d. per lb.
**Ammonium Benzoate.**—3s. to 3s. 6d. per lb., according to quantity.
**Ammonium Carbonate B.P.**—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
**Atropine Sulphate.**—12s. 6d. per oz. for English make.
**Barbitone.**—12s. 6d. per lb. Cheaper. Market less firm for Potash and Soda Salts.
**Benzonaphthol.**—5s. 3d. per lb. spot.
**Bismuth Salts.**—Prices reduced by about 1s. 3d. to 2s. 3d. per lb. on account of the fall in the price of the metal.
**Bismuth Carbonate.**—7s. 8d. to 9s. 8d. per lb.
**Bismuth Citrate.**—8s. to 10s. per lb.
**Bismuth Salicylate.**—7s. 5d. to 9s. 5d. per lb.
**Bismuth Subnitrate.**—6s. 10d. to 8s. 10d. per lb.
} Prices unsettled owing to difficulties in regard to supplies of the metal.
**Borax B.P.**—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
**Bromides.**—Potassium, 1s. 6d. per lb.; sodium, 1s. 7d. per lb.; ammonium, 1s. 11d. per lb. Market less firm for potash and soda salts.
**Calcium Lactate.**—1s. 7d. to 1s. 9d., according to quantity. Fair demand and steady market.
**Chloral Hydrate.**—4s. per lb.
**Chloroform.**—2s. 6d. per lb. for cwt. lots.
**Creosote Carbonate.**—6s. 6d. per lb. Little demand.
**Formaldehyde.**—£44 per ton, in barrels ex wharf London.
**Glycerophosphates.**—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
**Guaiacol Carbonate.**—8s. 3d. per lb.
**Hexamine.**—2s. 11d. per lb. For bold crystal. Powder slightly less.
**Homatropine Hydrobromide.**—25s. to 30s. per oz.
**Hydrastine Hydrochloride.**—English make offered at 120s. per oz.
**Hydroquinone.**—4s. 3d. per lb. in cwt. lots. Foreign make.
**Hypophosphites.**—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
**Iron Ammonium Citrate B.P.**—1s. 11d. to 2s. 3d. per lb.
**Magnesium Carbonate.**—Light Commercial, £36 per ton net. Light pure, £46 per ton.
**Magnesium Oxide.**—Light Commercial, £72 10s. per ton, less 2½%, price reduced; Heavy Commercial, £25 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
**Menthol.**—A.B.R. recrystallised B.P., 47s. 9d. per lb.; Synthetic 26s. to 35s. per lb. according to quality. English make. Increasing demand.
**Mercurials.**—Market very quiet. Mercury slightly easier. Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb.
**Methyl Salicylate.**—1s. 9d. to 1s. 11d. per lb.
**Methyl Sulphonel.**—21s. per lb.
**Metol.**—11s. per lb. British make.
**Morphine and Salts.**—Reduced by 1s. to 1s. 3d. per oz.
**Paraformaldehyde.**—2s. 8d. for B.P. quality.
**Paraldehyde.**—1s. 4d. to 1s. 6d. per lb., in free bottles and cases.
**Phenacetin.**—5s. 2d. per lb. in cwt. lots.
**Phenazone.**—6s. 6d. per lb.
**Phenolphthalein.**—4s. 8d. per lb. for cwt. lots.
**Potassium Bitartrate 99/100%** (Cream of Tartar).—86s. per cwt., less 2½% for ton lots. Raw material again dearer.
**Potassium Citrate.**—1s. 10d. to 2s. 2d. per lb.
**Potassium Ferricyanide.**—1s. 9d. per lb. Quiet.
**Potassium Iodide.**—16s. 8d. to 17s. 5d. per lb., according to quantity Steady market.
**Potassium Metabisulphite.**—7½d. per lb., 1-cwt. kegs included. f.o.r. London.
**Potassium Permanganate.**—B.P. crystals, 7½d. per lb., carriage paid; commercial, 8d. to 8½d. per lb., carriage paid. Forward prices higher.
**Quinine Sulphate.**—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
**Resorcin.**—5s. per lb. In fair quantities. Supplies exceed demand.
**Saccharin.**—63s. per lb. in 50-lb. lots.
**Salol.**—3s. 6d. per lb., for cwt. lots. Slightly dearer.
**Silver Proteinate.**—9s. per lb. for satisfactory product light in colour.
**Sodium Benzoate, B.P.**—1s. 10d. to 2s. per lb. From natural benzoic acid. Supplies of good quality available.
**Sodium Citrate, B.P.C., 1923.**—1s. 11d. to 2s. 2d. per lb., according to quantity.
**Sodium Hypophosphite, Photographic.**—£13 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
**Sodium Metabisulphite Crystals.**—37s. 6d. to 60s. per cwt., net cash, according to quantity.
**Sodium Nitroprusside.**—16s. per lb.
**Sodium Potassium Tartrate** (Rochelle Salt).—75s. per cwt., for ton lots and upwards.
**Sodium Salicylate.** Powder, 2s. 2d. to 2s. 3d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb. Flake, 2s. 6d. per lb. Strong demand, market firmer.
**Sodium Sulphide, pure recrystallised.**—10d. to 1s. 2d. per lb.
**Sodium Sulphite, anhydrous,** £27 10s. per ton, minimum 5 ton lots, according to quantity; 1 cwt. kegs included.
**Sulphonal.**—14s. 6d. per lb. Little demand.
**Thymol.**—18s. per lb. Firmer.

## Perfumery Chemicals

**Acetophenone.**—11s. per lb.
**Aubepine.**—12s. 6d. per lb.
**Amyl Acetate.**—3s. per lb.
**Amyl Butyrate.**—6s. 6d. per lb.
**Amyl Salicylate.**—3s. 3d. per lb.
**Anethol** (M.P. 21/22° C.).—4s. 6d. per lb.
**Benzyl Acetate from Chlorine-free Benzyl Alcohol.**—2s. 9d. per lb.
**Benzyl Alcohol free from Chlorine.**—2s. 9d. per lb.
**Benzaldehyde free from Chlorine.**—2s. 9d. per lb.
**Benzyl Benzoate.**—3s. 6d. per lb.
**Cinnamic Aldehyde Natural.**—16s. 6d. per lb.
**Coumarin.**—17s. per lb.
**Citronellol.**—22s. per lb. Advanced.
**Citral.**—10s. per lb.
**Ethyl Cinnamate.**—12s. 6d. per lb.
**Ethyl Phthalate.**—3s. per lb.
**Eugenol.**—10s. 6d. per lb.
**Geraniol. (Palmarosa).**—31s. 6d. per lb.
**Geraniol.**—12s. 6d. to 20s. per lb.
**Heliotropine.**—6s. 9d. per lb.
**Iso Eugenol.**—15s. 3d. per lb. Cheaper.
**Linalol ex Bois de Rose.**—25s. per lb. Cheaper.
**Linalyl Acetate.**—25s. per lb. Cheaper.
**Methyl Anthranilate.**—10s. per lb.
**Methyl Benzoate.**—5s. per lb.
**Musk Ambrette.**—50s. per lb.
**Musk Ketone.**—37s. 6d. per lb.
**Musk Xylol.**—12s. per lb.
**Nerolin.**—4s. 6d. per lb.
**Phenyl Ethyl Acetate.**—15s. 6d. per lb.
**Phenyl Ethyl Alcohol.**—14s. 3d. per lb.
**Rhodinol.**—50s. per lb.
**Safrol.**—1s. 10d. per lb.
**Terpineol.**—2s. 5d. per lb.
**Vanillin.**—25s. to 25s. 6d. per lb.

## Essential Oils

**Almond Oil, Foreign S.P.A.**—13s. 9d. per lb.
**Anise Oil.**—2s. 6d. per lb.
**Bergamot Oil.**—16s. per lb.
**Bourbon Geranium Oil.**—20s. per lb. Cheaper.
**Camphor Oil.**—65s. per cwt.
**Cananga Oil, Java.**—11s. per lb.
**Cinnamon Oil, Leaf.**—6d. per oz.
**Cassia Oil, 80/85%.**—9s. per lb.
**Citronella Oil.**—Java, 85/90%, 5s. 9d. per lb. Ceylon, 3s. 2d. to 3s. 5d. per lb., according to quality.
**Clove Oil.**—7s. 9d. per lb.
**Eucalyptus Oil, 70/75%.**—2s. 1d. per lb.
**Lavender Oil.**—French 38/40% Esters, 35s. per lb.
**Lemon Oil.**—3s. 4d. per lb.
**Lemongrass Oil.**—5s. 9d. per lb.
**Orange Oil, Sweet.**—10s. 9d. per lb.
**Otto of Rose Oil.**—Bulgarian, 42s. 6d. per oz. Anatolian, 28s. per oz.
**Palma Rosa Oil.**—16s. 9d. per lb.
**Peppermint Oil.**—Wayne County, 65s. per lb. Again dearer. Japanese, 19s. 3d. per lb.
**Petitgrain Oil.**—9s. 9d. per lb.
**Sandal Wood Oil.**—Mysore, 26s. 7d. per lb. Australian, 18s. 6d. per lb.

# Scottish Chemical Market

***The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.***

*Glasgow, February 26, 1925.*

THERE has been only a very moderate amount of business transacted in heavy chemicals during the past week, and while quoted prices are in the main steady, orders can in some instances be placed at slightly less than prices indicated, Continental suppliers especially being ready to work counter-offers.

### Industrial Chemicals

ACID ACETIC.—In moderate demand. 98/100% glacial quoted £56 to £67 per ton, according to quality and packing; 80%, pure, about £42 to £44 per ton; 80% technical, £41 to £43 per ton, packed in casks delivered c.i.f. U.K. ports, duty free.

ACID BORACIC.—Remains unchanged. Crystal or granulated, £45 per ton; powdered, £47 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Rather easier at about 5½d. per lb. delivered, with a probable concession for large quantities.

ACID CITRIC, B.P. CRYSTALS.—Unchanged at 1s. 4½d. per lb., less 5%, ex store.

ACID FORMIC, 85%.—Rather better inquiry. Spot lots quoted £53 10s. per ton, ex store. Offered from the continent at about £51 10s. per ton, c.i.f. U.K. ports.

ACID HYDROCHLORIC.—In little demand, price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Continental offers remain unchanged at about 3½d. per lb., ex wharf, spot material available at about 3¾d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. per lb., less 5% ex store, but could probably be obtained at a fraction less. Offered for early shipment at 11¾d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18% IRON FREE.—Spot lots unchanged at about £7 5s. per ton, ex store. Offered for prompt shipment from the continent at about £6 12s. 6d. per ton, c.i.f. U.K. port.

ALUM.—Lump potash alum, quoted £9 10s. per ton, ex store, spot delivery. Offered for prompt shipment from the continent at about £8 5s. per ton, c.i.f. U.K. port.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 6d. per lb., ex station, containers extra and returnable, with possible slight reduction for large quantities.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K. port.

AMMONIA LIQUID, 880°.—In steady demand, unchanged at 2½d. to 3d. per lb., delivered, according to quantity, containers extra.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture unchanged at about £30 per ton, ex station, packed in casks. Bags £1 per ton less. Offered from the continent at about £25 10s. per ton, c.i.f. U.K. port. Fine white crystals offered from the continent at about £21 per ton, c.i.f. U.K. port.

ARSENIC, WHITE POWDERED.—Spot lots unchanged at about £34 per ton, ex store, offered for early delivery at £32 per ton, ex wharf. Continental material quoted about £29 per ton, c.i.f. U.K. port.

BARIUM CHLORIDE, 98/100%.—Spot material of English manufacture quoted £11 10s. per ton, ex store. Large crystals offered from the continent at about £9 7s. 6d. per ton, c.i.f. U.K. port. Fine white crystals about £9 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots quoted £10 10s. per ton, ex station, contracts 20s. per ton less.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. port.

BORAX.—Unchanged. Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station; continental easier at about £4 per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £3 5s. per ton, ex works, packed in casks, free.

COPPER SULPHATE.—British material quoted £24 10s. per ton, f.o.b. U.K. port. Continental available at about £24 per ton, ex store. Offered from the continent at about £23 to £24 per ton, according to packages, c.i.f. U.K. port.

FORMALDEHYDE, 40%.—In moderate demand. Price for spot lots unchanged at about £45 per ton, ex store. Offered for prompt shipment from the continent at about £41 per ton, c.i.f. U.K. port.

GLAUBER SALTS.—White crystals of English manufacture unchanged at £4 per ton, ex store or station. Offered from the continent at about £3 7s. 6d. per ton, c.i.f. U.K. port.

LEAD, RED.—Imported material unchanged at about £44 per ton, ex store, spot delivery.

LEAD, WHITE.—Quoted, £46 10s. per ton, ex store.

LEAD, ACETATE.—Refined white crystals offered from the continent at about £47 per ton, c.i.f. U.K. ports. Spot material available at about £49 to £50 per ton, ex store. Dark brown quality quoted £40 per ton, c.i.f. U.K. port.

MAGNESITE CALCINED.—Unchanged at about £7 17s. 6d. per ton, ex station, prompt delivery. Hard burnt quality quoted £4 15s. per ton, ex station. Finer quality of continental manufacture quoted £7 15s. per ton, c.i.f. U.K. port.

MAGNESIUM CHLORIDE.—Offered from the continent at about £4 2s. 6d. per ton, c.i.f. U.K. port.

POTASH CAUSTIC, 88/92%.—Unchanged at about £29 per ton, ex wharf, prompt shipment from the continent. Spot material available at about £30 10s. per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5d. per lb. delivered.

POTASSIUM CARBONATE, 96/98%.—Continental prices unchanged at about £24 per ton, c.i.f. U.K. port. 90/92% quality quoted higher at about £23 per ton, c.i.f. U.K. ports. Spot lots of 96/98% material available at about £25 5s. per ton, ex store.

POTASSIUM CHLORATE.—Continental offers inclined to be higher. Now quoted 2¾d. per lb., c.i.f. U.K. port. Spot lots quoted 3d. per lb., ex store.

POTASSIUM NITRATE, SALTPETRE.—Refined granulated 99% on offer at about £25 per ton, c.i.f. U.K. port, prompt shipment from the continent. Spot material available at about £28 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Unchanged at about 8¾d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE, YELLOW.—In good demand and price unchanged at about 3¾d. per lb., ex store, spot delivery. Offered for early delivery at slightly less, ex wharf.

SODA, CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 12s. 6d. per ton; broken 60%, £17 2s. 6d. per ton; powdered 98/99%, £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—In little demand. Spot material unchanged at about £23 per ton, ex store. Offered from the continent at about £20 per ton, c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station; M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4d. per lb., delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station. Powdered or pea quality £1 7s. 6d. per ton more; alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £9 15s. per ton, ex station. Continental about £9 5s. per ton, ex store. Offered for forward delivery at about £8 5s. per ton, c.i.f. U.K. port. Pea crystals of English manufacture quoted £14 per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 17s. 6d. per ton, ex store; 96/98% refined quality 7s. 6d. per ton extra.

SODIUM NITRITE 100%.—Offered from the continent at about £24 15s. per ton, c.i.f. U.K. port.

SODIUM PRUSSIATE, YELLOW.—In moderate demand and price unchanged at 4½d. per lb., ex store.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, f.o.r. works. Good inquiry for export and higher price obtainable.

SODIUM SULPHIDE.—English manufacturers quote 60/65% solid, £15 per ton; broken, £1 per ton more; flake, £2 per ton more; crystals 31/34%, £9 5s. per ton, carriage paid U.K. stations. Minimum of 4-ton lots with slight reduction for contracts over a period. Continental material slightly cheaper: 60/62% solid offered at about £11 per ton, c.i.f. U.K. port; broken, £12 per ton, c.i.f. U.K. port; 30/32% crystals, £8 5s. per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £9 10s per ton; roll, £8 10s. per ton; rock, £8 7s. 6d.; ground, £8 5s.—ex store, prices nominal.

ZINC CHLORIDE.—96/98% Continental manufacture quoted £23 per ton, c.i.f. U.K. port. English material for export on offer at about £25 to £26 per ton, f.o.b. U.K. port.

ZINC SULPHATE.—Spot material quoted £12 10s. per ton, ex store, in little demand.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

### Coal Tar Intermediates and Wood Distillation Products

DIMETHYLANILINE.—Good home inquiries. Price 2s. 2d. per lb. d/d.

ALPHA NAPHTHYLAMINE.—Good home and export inquiries. Price 1s. 3d. per lb., f.o.b.

H. Acid.—Good home inquiries. Price 3s. 9d. per lb., 100%.
Amido Azo Benzole.—Some home inquiries. Price 2s. 10d. per lb., 100%.
Meta Toluylene Diamine.—Home and export inquiries. Price 3s. 10d. per lb., f.o.b.
Meta Phenylene Diamine.—Home and export inquiries. Price 4s. per lb., f.o.b.
Beta Naphthol.—Good home and export inquiries. Price 1s. per lb.
Paranitraniline.—Good home and export inquiries. Price 2s. 2d. per lb.
Benzaldehyde.—Good home inquiries. Price 2s. 3d. per lb.
Benzoic Acid.—Good home inquiries. Price 2s. per lb.
Ortho Toluidine.—Good export inquiries. Price 6d. per lb., f.o.b.—drums included.
Cleves Acid.—Small home inquiries. Price 3s. 1½d. per lb., 100%.

# The Manchester Chemical Market

(From Our Own Correspondent.)

*Manchester, February 27, 1925.*

There has been little if any expansion in the movement of chemical products on the market here, and the general position as regards home as well as export demand may be described as quiet. Domestic users of chemicals at the moment appear to be buying only moderate-sized parcels, while export business is of small extent and runs pretty well along the usual channels. Prices, however, show few important changes since last report.

### Heavy Chemicals

Bleaching powder is maintained at about £9 10s. per ton, but the demand for this material is rather limited. Saltcake meets with a moderate inquiry, with current values ranging round £4 per ton. Glauber salts are quiet at £3 10s. per ton. Phosphate of soda is attracting small attention and prices have an easy tendency at £13 per ton. Bicarbonate of soda is still offering at £10 10s. per ton, but the demand is on a comparatively small scale. Caustic soda still sells in fair quantities and prices continue steady at from £15 12s. 6d. per ton for 60 per cent. material to £18 per ton for 76-77 per cent. Alkali is in a somewhat similar position at about £6 15s. per ton. Sulphide of sodium is still only in quiet request, although current quotations show little change from last week; 60-65 per cent. concentrated solid is on offer at £13 15s. to £14 per ton and crystals at £9 10s. Acetate of soda prices are rather easy at £20 to £21 per ton, little buying interest being shown. Hyposulphite of soda is selling slowly at from £13 10s. to £13 15s. per ton for photographic crystals and round £9 10s. for commercial quality. Prussiate of soda is in limited request with values unchanged at about 4d. per lb., or a trifle less. Chlorate of soda still offers at 2⅝d. per lb. without attracting much attention. Bichromate of soda keeps fairly steady at about 4d. per lb.

Caustic potash is currently quoted at £30 10s. per ton, but the demand for this material is not particularly active. Carbonate of potash is steady and in fair demand at £23 10s. to £24 per ton. Permanganate of potash is in moderate inquiry at from 7d. to 8d. per lb., according to quality. Prussiate of potash is rather quiet but unchanged at 7½d. per lb. Bichromate of potash has sold in moderate quantities and the price has been maintained at round 5d. per lb. Chlorate of potash is still offering at 2¾d. per lb., but not much business has been put through.

Arsenic shows no sign of recovering strength and the demand for this product is very restricted; current value of white powdered, Cornish make, is between £34 and £35 per ton in Manchester. Sulphate of copper is fairly steady at £24 15s. to £25 per ton, f.o.b., but the demand is only of moderate dimensions. Commercial Epsom salts are in fair request and prices are well held at round £4 15s. per ton; magnesium sulphate, B.P. quality, continues to be quoted at about £6 15s. per ton. Nitrate of lead is about unchanged at £41 10s. to £42 per ton. Acetate of lead is steady but only in limited request at £47 10s. per ton for white and round £43 for brown material. Acetate of lime is in quietly steady inquiry at £15 10s. per ton for grey and £10 10s. to £11 for brown quality.

### Acids and Tar Products

Oxalic acid still fails to attract much attention and prices continue weak, although not much changed from last report, at 3½d. per lb. Acetic acid is quiet at £41 per ton for 80 per cent. commercial; glacial is offering at £67 to £68 per ton. Tartaric acid is steady and in fair inquiry at 1s. 0½d. per lb. Citric acid is maintained at last week's rate of 1s. 4½d. per lb.

Little business is being done in pitch, although values here still range from 42s. 6d. to 45s. per ton. Creosote oil is quiet but fairly steady at round 7d. per gallon. Carbolic acid is dull and easy at 5½d. to 5¾d. per lb. for crystals and 1s. 9d. per gallon for crude; these values are, however, more or less nominal. Naphthalenes are not attracting much attention; refined is on offer at £15 to £15 10s. per ton, and crude qualities at from £5. Solvent naphtha is still quoted at about 1s. 5½d. per gallon, but the demand is comparatively quiet.

# Fine Chemical Progress

### Dr. Rée on "Perfection of Existing Dyestuffs"

Speaking at the annual meeting of the Manchester Chamber of Commerce recently, Dr. Rée pointed out that in such products as the heavy soda compounds our exports had been greater than ever before, and in the home trade the sales of ammonium sulphate for the last half-year were about 40 per cent. in excess of those during the corresponding period of 1923.

A study of the official trade statistics revealed the directions in which our export markets had changed since pre-war times. As a result of the war some countries which previously imported British chemical products had developed chemical industries of their own. America, for instance, had practically disappeared from our export markets for heavy soda products and bleaching powder, and the same applied more or less to Italy. On the other hand, much larger quantities of British alkali were being exported to South America, Japan, India, Australia and Scandinavia. Among developments should be noted the definite establishment of the synthetic ammonia industry at Billingham; the building of a factory on the Humber for the manufacture of power alcohol from molasses and other allied products; and the production on a large scale by British firms of insulin. "Perfection of existing dyestuffs," said Dr. Rée, "in preference to the making of new ones has not infrequently been urged as sound policy by consumers, and with this I am in entire agreement. In addition to progress on these lines many dyes not hitherto made in this country—some twenty-five at least, distinct and essential types belonging to various categories—have been put on the market during the last twelve months, in quality equal to that of the foreign products which they have replaced."

### What Coal, Chemically Treated, Might Yield

Lecturing at the Huddersfield Technical College recently on coal economy from a national standpoint, Mr. W. H. Casmey, of Holdsworth and Sons, Ltd. (Bradford), said that tuberculosis was caused chiefly by atmospheric impurities from domestic fires, boiler, and metallurgical furnaces. The first step to stop smoke and save life was to burn coal correctly. It was a surprising fact that although coal was discovered 1,240 years ago, they were now considering how to burn it economically—i.e., without making smoke.

We produced in this country over 12,000,000 tons of furnace clinker and ashes yearly, and science had shown that by roughly grinding these and mixing with them a given weight of lime and water a mixture was found from which splendid bricks could be produced. The bricks were piled on small lorries, 400 on each, and then run into a circular steel chamber called an autoclavi, 60 ft. long by 6 ft. 6 in. in diameter. When the chamber was full, the end was screwed on and made steam-tight. Steam at 120 lb. pressure was then turned on and the bricks were kept under this pressure for about six hours, and when cooled they were ready for use. Fancy 5,000 million bricks made per year from clinker and ashes. And the $CO_2$ from our chimneys, when freed from smoke and dust, was a most valuable food for all vegetation, including fruit trees and root crops. There was material for building houses and food for the community from clinker and smoke.

In the future all our coal would be treated chemically before using it for power purposes thus bringing it on the same basis as ironstone, cotton, wool, or other raw material, and we should then find we could secure from one ton of coal 14 cwt. of smokeless fuel, three gallons of motor spirit, 17 gallons of oil, 15 lb. of sulphate of ammonia, and 5,000 cubic feet of rich gas, the total value being twice that of the coal.

# Company News

UNITED ALKALI CO.—A final ordinary dividend of 7½ per cent. is announced, making 12½ per cent. for the year, against 10 per cent. for 1923.

WAXED PAPERS, LTD.—The net profits for 1924 were £11,892 and £3,780 was brought forward. A dividend of 2½ per cent. is proposed on the ordinary shares, carrying forward £3,785.

BRITISH OIL AND CAKE MILLS, LTD.—The directors announce that arrangements have been made for the acquisition of the issued ordinary share capital of the seed crushing businesses of Owen Parry, Ltd., George Armstrong and Co., Ltd., and Walter Graham and Co., Ltd.

JOHN OAKEY AND SONS.—The net profits for 1924, including £3,483 brought forward, amount to £45,943. A dividend of 6 per cent. per annum has been paid to preference shareholders, and an interim dividend of 2½ per cent. to the ordinary shareholders, absorbing £12,250, leaving a balance of £33,693. The Board recommend a final dividend of 7½ per cent., less tax, to ordinary shareholders, making a total of 10 per cent. for the year; £10,000 to general reserve; £4,943 forward.

COURTAULDS, LTD.—The profits for 1924, after charging all taxation, depreciations, and expenses, and after carrying £400,000 to special reserve, account for insurance and £250,000 to a special reserve account for employees' old-age allowances, etc., amount to £3,880,745. The directors have decided to carry £1,000,000 to general reserve account, and to recommend the payment of a final dividend on the ordinary shares for 1924 of 2s. 9d. per share, free of income-tax, and to carry forward the balance of £1,034,594. The dividend will be payable on March 13, 1925, to shareholders registered in the books of the company on February 20.

## Chemical Trade Inquiries

***The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.***

OXIDE OF IRON.—Tenders are invited for supply and delivery of about 3,400 tons of new oxide of iron during 12 months ending March 31, 1926, for purification of gas, for the Manchester Gas Committee. Also for the purchase from the Corporation of the available spent oxide on the basis of the contents of sulphur and blue, and for the sale to the Corporation of spent oxide in place thereof. Forms of tender from Mr. J. H. Sillitoe, Gas Department, Town Hall.

OILS.—Tenders are invited for supply of the following illuminating oils for the Corporation of Trinity House, viz.:—175,000 gallons light mineral oil; 140,000 gallons heavy mineral oil; and 3,200 gallons rapeseed oil. Specifications, etc., from Trinity House, Tower Hill, E.C., to be returned by March 2.

INDUSTRIAL CHEMICALS, ETC.—A firm of chemical agents and commission merchants desires to get into touch with manufacturers and exporters who would send regular quotations of industrial chemicals, such as saltcake, caustic soda, borax, sulphur, China Clay, etc. Particulars from Moum and Co., Post Box 67, Helsingfors.

CHEMICAL MANURES FOR EGYPT.—The Commercial Secretary at Cairo reports that the Egyptian Ministry of Agriculture is calling for tenders, to be presented by May 2, for the supply of the following chemical manures: Nitrate of soda, 21,000 metric tons; nitrate of lime, 2,000 metric tons; sulphate of ammonia, 1,000 metric tons; superphosphate of lime, 3,000 metric tons; six hundred bales of E bags for bagging the nitrate of soda are also required. (Reference BX 1606.)

### Chemistry in History

THE supreme importance of chemistry and scientific research in the development of nations, and the scanty references made by historians to discoverers and discoveries in these fields, were emphasised by Professor G. G. Henderson, President of the Institute of Chemistry, in an address on "Science and History," at the annual open meeting of the Aberdeen Chemical Club, held in Marischal College, on Friday, February 20. Dr. William Thomas, lecturer in chemistry at Aberdeen University, president of the club, presided.

## New Chemical Trade Marks

### Applications for Registration

*This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.*

*Opposition to the Registration of the following Trade Marks can be lodged up to March 11, 1925.*

"CALESCO."

454,863. For sanitary washable distemper in the nature of paint. Charles Ambrose Devereux Harman, trading as Thomas Smith and Son, 238 and 240, Whitechapel Road, London, E.1; varnish, colour and japan manufacturer. December 30, 1924.

"NAYRODEC."

454,901. For distemper paint. Naylor Brothers (London) Ltd., Wexam Road, Slough, Buckinghamshire; varnish paint, enamel and distemper manufacturers. December 31 1924.

"CRETAROL."

452,238. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Class 2, Leslie Allan and Co., Ltd., Rainford Works, Rainford, Lancashire; refiners and distillers of petroleum and tar products. September 29, 1924.

*Opposition to the Registration of the following Trade Marks can be lodged up to March 18, 1925.*

"PETROHOL."

439,981. For isopropyl alcohol, being a chemical substance for use in manufactures. Standard Oil Company (a company incorporated under the laws of the State of New Jersey, United States of America), Constable Hook, Bayonne, Hudson County, New Jersey, United States of America; refiners of oil, manufacturers and merchants. August 18, 1923. (To be associated, Section 24.)

439,982. For isopropyl alcohol prepared for use as a disinfectant. Standard Oil Company (a company incorporated under the laws of the State of New Jersey, United States of America), Constable Hook, Bayonne, Hudson County, New Jersey, United States of America; refiners of oil, manufacturers and merchants. August 18, 1923. (To be associated, Section 24.)

"SMOOTH-ON."

454,961. For a metallic compound in powder form, for repairing defects in iron and other metallic structures, and for removing and preventing scale in boilers. Class I. Smooth-on Manufacturing Company (a corporation organised under the laws of the State of New Jersey, United States of America), 570 to 574, Communipaw Avenue, Jersey City, Hudson County, State of New Jersey, United States of America; manufacturers. January 2, 1925. Advertised before acceptance, the applicants alleging distinctiveness.

"AQUAVAR."

455,042. For chemical substances prepared for use in manufactures, photography, or philosophical research and anti-corrosives. Hadfields (Merton), Ltd., Western Road, Mitcham, Surrey; enamel manufacturers. January 6, 1925.

"HOLDENOID."

455,073. For chemical substances used in manufactures, photography or philosophical research and anti-corrosives, Class 1. Arthur Holden and Sons, Ltd., 218 and 219, Bradford Street, Birmingham; manufacturers. January 6, 1925. (To be associated, Section 24.)

"HOLDITE."

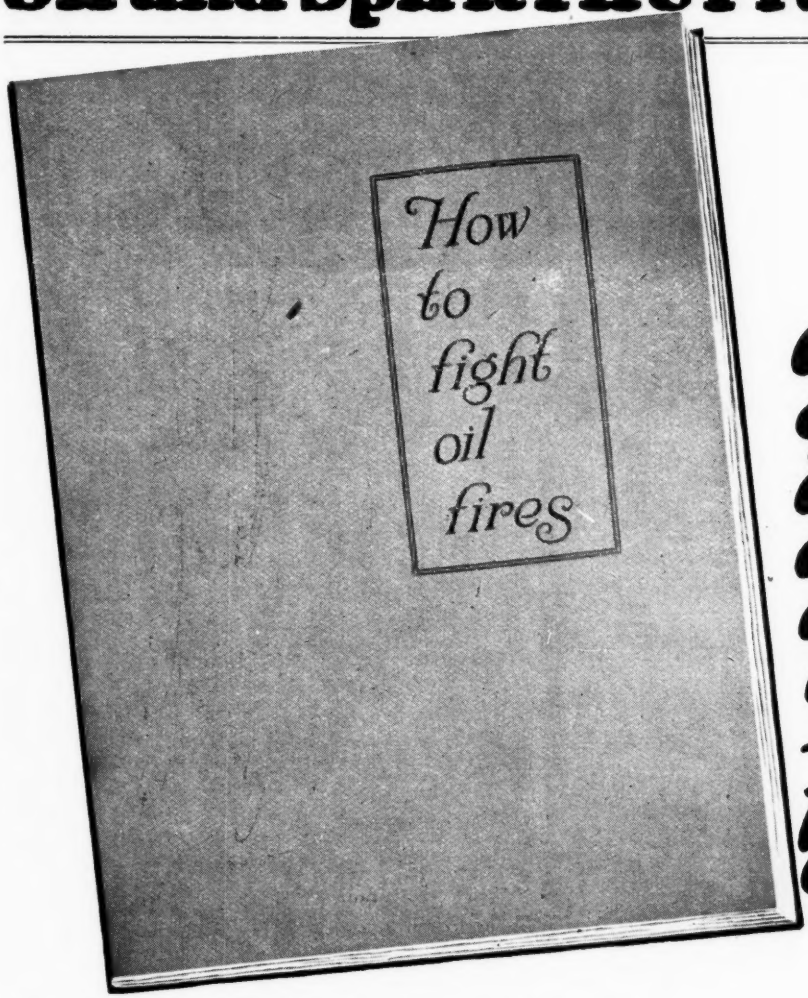
455,074. For chemical substances used in manufactures, photography, or philosophical research and anti-corrosives. Class 1. Arthur Holden and Sons, Ltd., 218 and 219, Bradford Street, Birmingham; manufacturers. January 6, 1924. (To be associated, Section 24.)

*Opposition to the Registration of the following Trade Mark can be lodged up to March 25, 1925.*

"ISOS."

454,652. For oils for use in the textile and leather manufactures, not included in other Classes. Class 4. The Midland Tar Distillers, Ltd., Exchange Buildings, Stephenson Place, Birmingham; manufacturers. December 18, 1924.

# Oil and Spirit Fire Protection!

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THIS book is being published to give practical first-hand information on the problem of dealing effectively with fires on premises where oils and spirits are stored or used in bulk, and also on oil-fuel and motor driven ships, etc. The modern method of oil and spirit fire extinction by means of foam is fully explained, and there are diagrams of typical Phomene Foam Installations. The various types of Phomene Engines are also fully described and illustrated. The whole subject receives full and adequate treatment by Fire and Marine Engineers.

*The Phomene Appliances described in the above publication are manufactured by the makers of the well-known Pyrene and Conquest Fire Extinguishers.*

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# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## County Court Judgment

*[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]*

WALKER (J. KNOX) AND CO., LTD., 422, Kingsland Road, N., manufacturing chemists. (C.C., 28/2/25.) £17 1s. 10d. October 22.

## Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

BASS AND CO., LTD., Cheltenham, dyers. (M., 28/2/25.) Registered February 11, £1,000 mortgage and debenture collateral thereto, to Mrs. F. A. Billings, Wansbeck, Blackmore Road, Malvern; charged on 1, Oxford Place, and premises in Old Bath Road, Cheltenham, and general charge. *£1,000. September 14, 1923.

PENNY BROTHERS AND WINDER, LTD., Preston, bleachers. (M., 28/2/25.) Registered February 12, £50,000 debentures; general charge. *Nil. October 28, 1924.

TAYLORS' DRUG CO., LTD., Leeds. (M., 28/2/25.) Registered February 11, £1,500 mortgage, to Mrs. E. Speight, 23, The Avenue, Roundhay, and others; charged on premises in Bridge Place, Worksop; also registered February 13, £800 mortgage, to A. Barraclough, 14, Ashwood Villas, Headingley, wholesale clothier; charged on 469, Anlaby Road, Hull; also registered February 13, £500 mortgage, to J. H. Armitage, 19, Park View Crescent, Roundhay, and another; charged on 469, Anlaby Road, Hull. *£111,744 os. 11d. September 12, 1924.

### Satisfactions

BASS AND CO., LTD., Cheltenham, dyers. (M.S., 28/2/25.) Satisfaction registered February 11, £1,000, registered July 16, 1914.

HAMPSHIRE (F. W.) AND CO., LTD., Derby, manufacturing chemists. (M.S., 28/2/25.) Satisfactions registered February 10, £400, registered May 26, 1921; £300, registered June 2, 1921; £5,000, registered August 8, 1921; and £3,000 (not ex.), registered September 30, 1921.

## London Gazette, &c.

### Company Winding Up Voluntarily

CHILD (E.) AND CO., LTD. (C.W.U.V., 28/2/25.) By special resolution, January 26, confirmed February 11. D. J. Brannan, 9-10, King Street, London, E.C.2, appointed liquidator.

### Notice of Intended Dividend

SWITHENBANK, Harold, 132, Beeches Road, West Bromwich, analytical chemist. Last day for receiving proofs, March 11. Trustee: T. Easton, 191, Corporation Street, Birmingham, official receiver.

## New Companies Registered

DUNSTABLE PORTLAND CEMENT CO., LTD., 110, Cannon Street, London, E.C. Manufacturers of and dealers in cement, limes, whiting, plaster, ground chalk, and any articles compounded thereof, any article made of cement, artificial stone, concrete, ferro-concrete, etc. Nominal capital, £300,000 in 125,000 preference and 175,000 ordinary shares of £1 each.

EDWIN HEYWOOD, LTD., 29 Nelson Street, Bradford. Chemical manufacturers, dyers, cleaners, bleachers, etc. Nominal capital, £1,000 in £1 shares.

MORGAN WILLIAMS AND LLEWELLYN, LTD. Distillers of petroleum and tar products; manufacturers of lubricating oils and greases, tar macadam, etc. Nominal capital, £5,000 in £1 shares. Solicitor: D. O. Thomas and Williams, 14, Wind Street, Swansea.

ZINC OXIDES, LTD. Manufacturers of, dealers in or treaters of zinc oxide, zinc, dust, spelter, acids, lead, ores and hardware and minerals of all kinds, etc. Nominal capital, £5,000 in £1 shares.

## Tariff Changes

AUSTRALIA.—The full conditions which will apply to all United Kingdom goods invoiced to the Commonwealth on and after April 1 are printed in the *Board of Trade Journal* for February 19.

SARAWAK.—The following duties have been fixed: Imports, liquid fuel, $·01; benzine, petrol, methylated spirit, etc., $·03. Exports, camphor, per pikul, $5; copra, 5 per cent., *ad valorem*; gambier, 2½ per cent., *ad valorem*.

GERMANY.—An Order, dated February 7, and effective as from February 16, allows the exportation from Germany of gold chloride in consignments exceeding 50 grs. net, and of silver nitrate and silver chloride in consignments exceeding 500 grs. net (ex-Tariff No. 317) without licence.

PORTUGAL.—An Order abolishes the export surtaxes on fertilisers.

### Mangold Brothers: Discharge Suspended

THE affairs of Louis Augustus Mangold and Charles Bernard Mangold (trading as Mangold Bros)., chemical merchants, 17, Harp Lane, London, E.C., who were adjudged bankrupt on August 18 last, came before Mr. Registrar Francke in the London Bankruptcy Court on Friday, February 20, on the hearing of their application for an order of discharge.

The Official Receiver said that he estimated that the debtors' return of their ranking liabilities at £5,656 was, according to the report of the trustees in bankruptcy, approximately correct. The trustee had stated that the assets, which were estimated by the debtors at £1,260, had already realised £364 and a further £205 was anticipated. A dividend of between 2s. 6d. and 3s. in the £ was expected, except on a deferred claim amounting to £3,128. L. A. Mangold began business as a chemical merchant at 17, Harp Lane, E.C., in 1917, and in February, 1919, he was joined in partnership by his brother, C. B. Mangold. The trading name of the business was then altered to Mangold Bros. The trading proved fairly successful until May last, but then began to decline in consequence of a fall in prices and of foreign competition. The debtors attributed their insolvency to lack of capital, to a heavy fall in markets, and to German competition. A full set of books of account and balance sheets had been kept by the debtors, and they had been produced. But money borrowed by L. A. Mangold from his mother and a friend before beginning the partnership was treated as capital and not entered as loans. The debtors asserted that their business was a key industry and was prosperous while there was protection, but when the latter was removed it fell off and their stock which had been bought at high prices depreciated to practically nothing. It was impossible to compete against German prices.

On two statutory grounds the debtors' discharge was suspended for two years.